IDG .com

FREE TECH LUNCH?

Find out if free services on the Web are worth the trouble for business users. Page 60

EXEC ED FLAVORS

Leadership training comes in enough varieties to satisfy all career tastes. Page 40

FACE-OFF OVER PRIVACY

Should Washington help protect online data? Or should we leave it up to the private sector? Two experts offer their views. Page 27

COMPUTERWORLD

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JULY 3, 2000 ▪ VOL. 34 ▪ NO. 27 ▪ $5/COPY

OPTICAL image of the Crab Nebula

PALOMAR OBSERVATORY

ANYBODY OUT THERE?

THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE PROJECT STRUNG TOGETHER 2 million computers across the Internet to create SETI@-home, a virtual supercomputer that listens for signals from life in space. The SETI project may or may not find ET, but Kathleen Melymuka reports that it's triggering new thinking about the potential for distributed computing — in business applications that range from oil exploration to animation. Also, on page 54, Gary H. Anthes reports on more earthly supercomputers making a comeback. *Story begins on page 36.*

DAVE McNETT's Distributed.net has lassoed 190,000 PCs

POTTERMANIA STRAINS THE SUPPLY CHAIN

Retailers expect new Harry Potter book to be largest-ever e-commerce shipment

BY JULIA KING

It's another five days before the latest Harry Potter book is due to hit store shelves. Yet for weeks, the fictional orphan-turned-wizard-in-training has been causing a frenzy for Web developers, logistics planners and distribution groups at big real-world companies such as Amazon.com Inc., Borders Group Inc. and Federal Express Corp.

ONLINE RETAILERS

Book No. 4 in the popular children's series is expected to yield the largest-ever shipment of an e-commerce product and has every link in the B-to-B supply chain scrambling to ensure that demand can be met.

"As a corporation, we've been planning on this release for months," said Rich Fahle, content manager at Ann Arbor, Mich.-based Borders.com.

As of last week, Borders had racked up more than 100,000 orders for the J. K. Rowling book, whose July 8 release has been shrouded in secrecy.

It wasn't until last week that the book's U.S. publisher, New

Harry Potter, page 16

WEB HOST'S OUTAGE CRASHES SITES

Verio blames problem on router upgrade

BY JENNIFER DiSABATINO

More than 1,000 Web sites were taken off-line or slowed over the past two weeks as a result of problems in the Vienna, Va., data center of Internet hosting firm Verio Inc.

Verio officials confirmed Wednesday that about 1,200 Web sites — 2% of the 60,000 hosted at the Vienna facility — were affected to varying degrees by the router problems, which began June 23.

The problem started when Verio did a routine update of configuration tables on its Cisco Systems Inc. routers, said Doug Schneider, Verio's president of Web services.

"It took us a little while to recognize that the configuration tables were causing [the problem]," Schneider said, because the problem was intermittent. Technicians fixed it by Wednesday, he said.

International Data Corp. in Framingham, Mass., reported in April that Verio had 7.6% of the Web hosting market last year. That figure made it No. 2

Verio, page 73

USERS RELIEVED BY MERGER HALT

European body, DOJ block WorldCom deal

BY JAMES COPE AND TODD WEISS

Many corporate telecommunications customers were relieved last week when the European Commission and the U.S. Department of Justice took separate actions to halt the proposed merger of WorldCom Inc. and Sprint Corp.

John Fischer, an executive vice president at The CIT Group Inc. in Livingston, N.J., said his company's selection of WorldCom as its primary telecommunications provider four years ago was short-lived.

"During the first year [with WorldCom], we were very pleased," he said. Shortly thereafter, Fischer said, he noticed a slowdown in his company's domestic and international data traffic that went through WorldCom's frame-relay system. "The bandwidth availability was there," said Fischer, "but it was overutilized [by too many customers]. Too much traffic was going

Merger, page 73

AT A GLANCE

Sorry — Try Again Later

Merger announced: **10/4/99**

Sprint shareholders approve merger: **4/28/00**

WorldCom shareholders approve merger: **4/28/00**

WorldCom and Sprint withdraw merger application in Europe: **6/27/00**

U.S. Department of Justice files a lawsuit to block merger: **6/27/00**

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Hands-Free OS Installation

Broadcasting Push/Pull

Event Monitoring And Automation

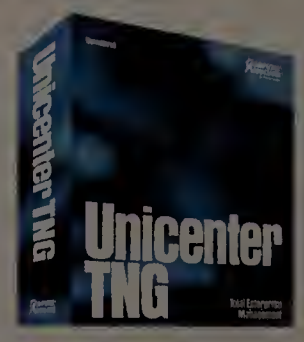
SOFTWARE DISTRIBUTION

Roaming Users Support

Dynamic Groups

N-Tiered Distribution

Secure Data Transport System



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CHRISTOPHER WEIL

SEARCH ENGINES FOR THE ENTERPRISE

Whether they're driving an e-commerce site or a corporate intranet, search engines are increasingly being used in critical business processes, as Markon Pen and Pencil's Paul Gellman can testify. Page 56

CHRIS HARTLOVE

INCUBATOR HATCHLING

College incubators are helping ambitious IT students such as Andy Lufburrow (front) get a head start on launching their own companies. Page 64

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42 WORKERS CALL the shots in today's market. Find out from our hiring survey what the job market's really like.

44 COMPANIES PUT heavy weight on knowledge management projects, but the projects often fail. Find out why.

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48 IBM EXECUTIVE Steve Mills says Microsoft is showing that it understands the need to connect to other vendors' systems.

51 IBM LAST WEEK announced a chip designed to compress data and effectively double a computer's memory.

QUICKSTUDY

52 KERBEROS LETS computers verify one another's identity across an insecure network such as the Internet.

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60 FREE WEB SERVICES can give business users a cost-effective complement to existing information services — if users can deal with some drawbacks.

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62 DATACORE SOFTWARE offers SANsymphony storage-area network software for a fraction of the cost of traditional SANs, the company says.

This Week Online

- **Computerworld.com** features Gartner Institute analyst **Barbara Gomolski,** who says IT managers could solve half their labor problems by rejecting doomed projects they now assign to staffers.
- Come to the **B-to-B E-Commerce Community Page** and share your thoughts on the Federal Trade Commission's recent B-to-B workshop.
- Our online-only **"How it Works" box** lets you find out more about this week's **front-page feature** on the distributed computing network used in the search for extraterrestrial intelligence.

OPINIONS

26 MARK HALL says few outside of IT understand the importance that computing played in the success of the human genome project.

28 JOHN GANTZ says education and on-the-job training will become increasingly important in keeping your best IT people.

74 FRANK HAYES points out that project-management problems are part of U.S. history: Just look at the Revolutionary War!

PRIVACY FACE-OFF

27 JASON CATLETT writes that the growth of the World Wide Web demonstrates the need for new laws.

27 RONALD L. PLESSER says privacy is important but is best handled by leaving it to the private sector.

MICROSOFT

28 MICHAEL GARTENBERG outlines three reasons why breaking up Microsoft is a bad idea.

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Nationwide's CIO Turns Tables on Research Firms

Insurer demands that they cut overlap and devise a unique package together

BY JULIA KING

LIKE MOST CIOS, Bruce Barnes at Nationwide used to buy off-the-shelf information technology research from all the big players — Forrester Research Inc., Gartner Group Inc. and Meta Group Inc., to name a few.

"It was like the milkman who says, 'Here's what I'm selling today. How much are you going to take?' " Barnes recalled. "In many ways, they all sell the same stuff, so they overlap like crazy."

Not anymore.

Under what one analyst described as "an absolutely unique" deal, Barnes now requires that the research competitors work together to provide a comprehensive package of services customized exclusively for Nationwide. So far, the one-of-a-kind deal, which marks its first anniversary this month, has cut the Columbus, Ohio-based insurance provider's annual IT research subscription tab by 40%, to less than $600,000.

Coming Together

"It works out a lot better," said Lori King, an IT architecture specialist at Nationwide who uses product evaluation research primarily from Gartner Group and Meta Group, both based in Stamford, Conn., in her day-to-day work.

"Before, I had a whole bunch of information, and it was harder to focus," said King.

Not surprisingly, getting the research firms to work together wasn't easy. First, Barnes herded salespeople from Gartner, Meta Group, Cambridge, Mass.-based Forrester and Giga Information Group Inc., also in Cambridge, into a conference room to lay out his plan.

Barnes and a cross-functional team representing all of Nationwide's lines of business had divided the services they wanted into six key categories: strategy and technology trending, product evaluation, piloting and prototyping, implementation, optimization and asset retirement.

They then directed the vendors to decide which of the categories matched their own "sweet spots" and to return in three weeks with a joint plan for delivering those research services.

Barnes threatened to pull all business from companies that refused to provide their services under Nationwide's new model. That's when the phone calls began. "I got calls from several senior officials of these companies who told me that I was stupid and that this wasn't the way to do business," said Barnes. Still, three weeks later, the vendors had a plan.

Thornton May, an analyst at Cambridge Technology Partners Inc. in Cambridge, Mass., said Fortune 500 companies now spend an average of $250,000 to $400,000 on IT research that's largely redundant.

BRUCE BARNES cut Nationwide's research bill by 40%

May said that most companies could cut their research costs significantly by making vendors provide select information, rather than buying off-the-shelf services.

"Right now, research vendors sell to clients on their basis," May explained. " It's not value-based pricing, but vendor-based pricing."

The CIO at a large food company who asked that his name be withheld said he found so much overlap between Gartner and Giga that he won't be using Giga next year.

"The best value I get out of Gartner Group is I get six or seven tickets to their annual fall symposium in Orlando, and we go down there and just drink from the fire hose," the CIO said. "You get all of their published data in a week."

Carol Wallace, a spokeswoman for Gartner Group, said she disagreed that the way the research firm is doing business with Nationwide is anything "innovative" or "highly unusual."

"This was basically a competitive pitch that they conducted with all [the] firms in the same room at the same time," Wallace said.

But Mike Conley, global sales manager at Forrester, said the Nationwide deal was "the first time we had ever been confronted that way."

Wells Fargo's IT Arm Blazes Java, XML Trail

Develops multitier architecture that ties together legacy customer data

BY CAROL SLIWA
NEW YORK

Wells Fargo & Co. has laid the groundwork for one of its most ambitious XML initiatives to date, taking a pioneering approach to the common problem of making legacy data available for new uses.

The San Francisco-based financial services company's information technology arm has built a Java-based middle tier that will use XML to help tie together customer data from multiple sources to create a profiling and referral system, enterprise architect Bob Carasik told the XML DevCon gathering here last week.

At a time when major XML projects are still on the drawing board at many companies, Wells Fargo's project is an example of a flexible multitier architectural approach that companies can use to deliver legacy data to a wide range of client devices or other businesses from a variety of backend systems, analysts said.

"This is representative of a future mainstream trend, which is basically getting a lot of additional value out of your enterprise applications by leveraging XML to open them up to a much broader audience," said Peter O'Kelly, an analyst at Boston-based Patricia Seybold Group Inc.

Josh Walker, an analyst at Forrester Research Inc. in Cambridge, Mass., said XML and Java are still in their infancies, but they're well suited to each other, since "Java is portable code and XML is portable data."

Part of the impetus for the Wells Fargo project was the need to sell the same products to all the bank's customers in the wake of a 1998 merger with Norwest Bank, Carasik said. For instance, Norwest sold mortgages before the merger, but Wells Fargo didn't.

So Wells Fargo pulled together retail customer data from different sources into a single IBM-mainframe-based DB2 database and built a middle tier, using Enterprise JavaBeans and San Jose-based BEA Systems Inc.'s WebLogic application server to help direct the data between the mainframe and various client machines.

AT A GLANCE

Decision Time

Technical decisions Wells Fargo faced included:

- How much of the immature XML specification to use.
- Whether to translate data to XML on the mainframe or the application server.
- Whether to send XML over HTTP to the Web server or send it via Remote Method Invocation.

Carasik said he expects that the architecture will allow the company to access other databases and exchange data with other businesses. Wells Fargo has even built privacy attributes into the XML-based profiles so they can be adapted to changing regulatory requirements, he added.

In setting up the new system, one of the key decisions that Wells Fargo faced was how much of the immature XML specification it could use. Carasik said the firm stuck with widely used pieces.

Another key decision was where to transform the data into XML. Carasik said the company opted to do that on the application server, where the tools were better, rather than on the mainframe. That way, it didn't have to spend time and money changing the mainframe's existing transport — fixed-format messages via Open Database Connectivity (ODBC).

"We're more concerned with using our resources to add additional data sources than we are with upgrading the messaging interface to that one database," Carasik said.

Instead, the message delivered via ODBC is wrapped into a Java Database Connectivity interface and shown to a program that Wells Fargo wrote. The program decodes the message and builds a new XML message with the customer profile. That XML-based profile is then sent to a Web server via HTTP.

Wells Fargo sends asynchronous messages from the middle tier to the client via the Web protocol HTTP rather than via Remote Method Invocation. "That's the way you want to build systems that go over an unreliable network like the Internet," according to David Smith, an analyst at Gartner Group Inc. in Stamford, Conn.

Also, Carasik said, "if the server interface changes, the client programs reading the XML data don't have to change ... [because] the data is accessed by name, not by position in the message."

MORE THIS ISSUE

For more on Wells Fargo, **see story on page 10.**

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AT DEADLINE

Clinton Signs Digital Signature Bill

Saying it would "open up new frontiers of economic opportunity while protecting the rights of American consumers," President Clinton on Friday signed the Electronic Signatures in Global and National Commerce Act, or E-Sign. The bill, passed definitively through Congress two weeks ago, puts the force of national law behind electronic-signature transactions.

5,400 Jobs Lost

As the body count of failed dot-com companies continues to rise this year, so does the number of job cuts made by Internet ventures that have gone out of business or laid off workers. A survey released last week put the number of eliminated dot-com jobs at more than 5,000 since December. The survey, by Chicago-based outplacement firm Challenger, Gray & Christmas Inc., found that nearly 5,400 employees had lost their jobs at 59 companies.

IBM Soups Up Supercomputer

Users wondering about the scalability of their RS/6000 SP server architectures might want to take a look at last week's ASCI White supercomputer announcement from IBM. Featuring 512 server nodes, 6 terabytes (TB) of memory and more than 120TB of storage, the system is the most powerful supercomputer in the world and draws many of its technologies from commercially available RS/6000 systems.

Corrections

- In the Tech Briefs on page 77 of the June 19 issue, the price for Compaq Computer Corp.'s Private Storage Utility was incorrect. Pricing for the basic service ranges from $35/GB to $55/GB per month.
- A Page One story in the June 26 issue about Inacom Corp. filing for bankruptcy protection misstated the number of users at Blue Cross/Blue Shield of Michigan who were affected when Inacom ended operations. The correct number is more than 8,000.

Allstate Kicks Off Rollout of Web Sales

Company shifts 6,000 insurance agent positions to contractor jobs; 15% quit

BY MARIA TROMBLY
NEW YORK

ALLSTATE Insurance Co. has begun a massive restructuring this month, rolling out a national program to sell insurance directly to customers on the Web. In the process, it's eliminating all of its 6,000 employee agent positions and making them independent contractors.

Edward Liddy, Allstate's president and CEO, announced last week that the Northbrook, Ill., company is expanding its Internet and call center service, which began with a "soft launch" in Oregon in May.

The company's agents, Liddy said, were given the option of joining Allstate's current force of 7,500 independent contractors by July 1. The contractors earn a higher commission than employees but are responsible for their own benefits, office expenses and staffs. About 15% of the former employees left the company, he said.

"This is a bold step," said Lee Spirer, head of the financial services practice at Cambridge, Mass.-based Mainspring Communications Inc., an Internet strategy consulting firm.

"Clearly, there was thought that went into it, and the benefits of making the switch now outweighed the short-term costs," said Spirer.

Allstate's plan is unique in that the company doesn't plan to join forces with online aggregators.

E-Insurance

Online insurance sellers:

Progressive Casualty Insurance Co.
www.progressive.com

Esurance Inc.
www.esurance.com

eCoverage P&C Insurance Services Inc.
www.ecoverage.com

E-Insure Services Inc.
www.e-insurance.com

"We have what all the aggregators want," Liddy said. "We have the brand." The addition of Internet and call center capabilities gives Allstate a "much more powerful way of selling" its insurance products than relying on aggregators would, he said.

Allstate isn't giving up much, according to Spirer.

"The aggregators have not proven to drive substantial business for any of the providers yet," he said.

So far, only automobile insurance is available through Allstate's Web site and call centers. That's a smart place to start, said Linda Alt, an analyst at Stamford, Conn.-based Gartner Group Inc. "Auto insurance is the primary insurance that most people are shopping for online," she said.

Liddy said Allstate plans to add homeowners' insurance in September. "That's something that an Internet-only company wouldn't be able to do," he said. "You have to have a physical presence to be able to go out and inspect the homes."

It took several months for Allstate to develop its Internet strategy and ensure commitment from all levels of management, Liddy said.

"I suppose when I look back on what we're trying to get done, moving even faster would have been a smart thing to do," he said. "The price for inactivity can be very high."

Customers Not Troubled By Oracle's Spying Tactics

Ellison denies he knew of spying on Microsoft lobbyists

BY CHRISTINE McGEEVER AND DOMINIQUE DECKMYN
REDWOOD SHORES, CALIF.

The packed house at Oracle Corp.'s product announcement last week had little to do with the incremental upgrade to Oracle8i or the Internet development tools the software maker unveiled. Instead, CEO Larry Ellison was peppered with questions about what he knew and when he knew about his company's covert investigation of lobbying groups aligned with Microsoft Corp.

Oracle has acknowledged that it financed an investigation of the lobbying groups. However, Ellison denied knowing until recently that his company hired Washington-based Investigation Group International Inc. (IGI) to do it.

Ellison's repeated response of "nothing" apparently sits well with Oracle users and partners, who see the company's spy tactics as business as usual.

"I think [Oracle has] a superior product. They have nothing to worry about [and they don't need to resort to spying tactics]," commented Vince Bertone, MIS director at Miteq Inc. in Hauppauge, N.Y.

"It's not going to discourage me from buying Oracle, and it's not going to discourage me from buying Microsoft. It's kind of humorous," said Jeffrey Thompson, information technology director at Integrated Measurement Systems Inc. in Beaverton, Ore. "Ellison isn't involved in how the products work, and that's what really matters to me."

But Ellison is involved in Oracle's business strategies, and he supported the U.S. Department of Justice antitrust investigation that spawned Microsoft-sympathetic ad campaigns by lobbying groups, including the Independent Institute, the National Taxpayers Union and the Association for Competitive Technology (ACT).

"I didn't go through Bill's garbage," Ellison said, referring to reports that IGI staff tried to obtain ACT documents by offering an office cleaning crew $1,200 for the association's trash.

In addition to ACT's allegation of bribery on the part of IGI, the groups said confidential information about funding was leaked to the press during the period when IGI was investigating them.

According to Ellison, staff in Oracle's government affairs office in Washington dispatched IGI last June. "I authorized them to investigate Microsoft's covert activities" and authorized a budget to do so, but "I never heard of IGI until [the press story broke last week]," he said. "The second I found out about it, I disclosed it."

"We always knew there was a concerted effort by our competitors to bring this case into the government arena, but we didn't think they would go to these depths," Microsoft spokesman Rick Miller said.

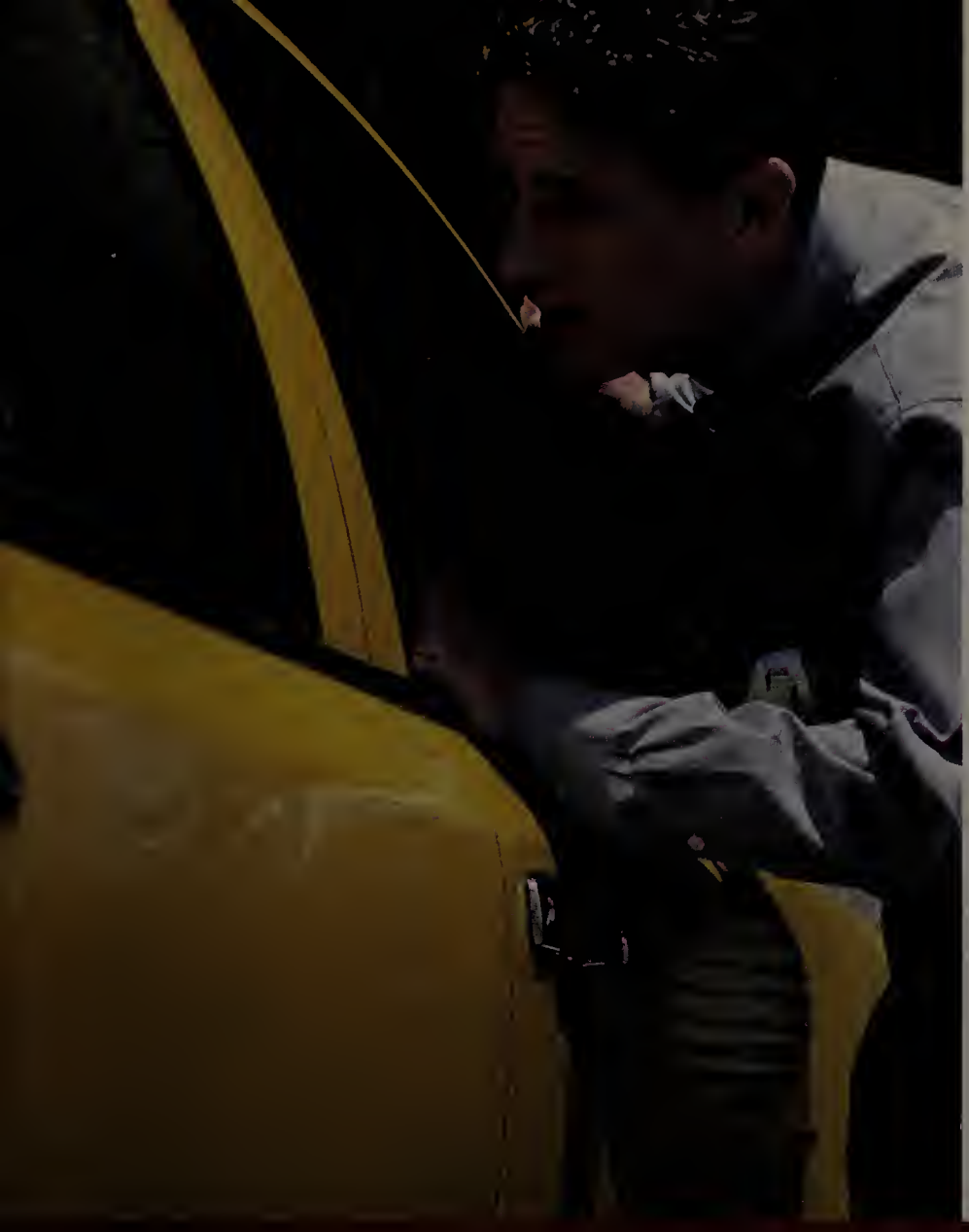
The fact that Oracle's product announcements went virtually unnoticed is ironic, according to Kate Mitchell, senior vice president of marketing and business at Software Technology Corp., an Oracle business partner in Monrovia, Calif. She said the products reflect the company's aggressive promotion of enterprise resource planning and customer relationship management systems built exclusively on Oracle products.

Oh, by the Way. . .

Oracle announced:

Internet Development Suite for building electronic-business applications.
Available now for $4,995

Internet Application Server, providing performance enhancements and integrated query and reporting for business intelligence.
Available now for $5 to $30 per power unit



Flashcom's Chief Technology Officer – Michael Jones. "AT&T Business Network gave us a single-source, Web-based networking solution that easily keeps up with our company's rapid expansion."

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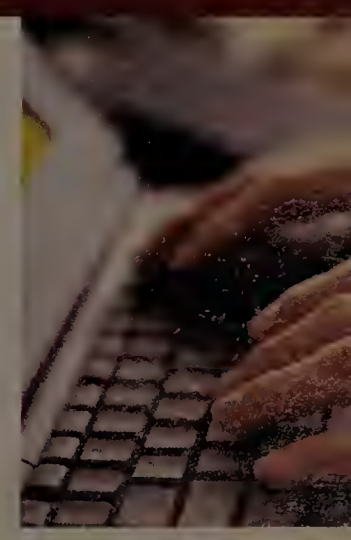

Hurry, I'm on Internet time. Flashcom, one of the nation's leading broadband service providers, wanted a more innovative and cost-effective communications network that adapts as their company expands. They also wanted to manage the solution in a Web environment. **AT&T Business Network** provided Flashcom an integrated network solution consisting of a full range of data, IP, wireless, local, international and long distance services. All through **one contract**, **one monthly bill** and a **single point of contact** for customer care. And, AT&T Business Network allows Flashcom to order services, track maintenance requests and pay charges - **all online**. If your company wants simplicity and cost-effectiveness from a company that can grow with you, let AT&T Business Services take you there - **now**.

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BRIEFS

Loudcloud Gets a Silver (Dollar) Lining

Loudcloud Inc., Internet pioneer Marc Andreessen's second venture, has raised $120 million in additional funding from eight venture capital firms. The closely held company, based in Sunnyvale, Calif., helps firms quickly set up Web operations and then manages the operations. Loudcloud said investors collectively will get less than 20% of its equity, pointing to a valuation of more than $600 million for the company founded just eight months ago.

3Com Posts Results, Exits Markets

3Com Corp. reported a fiscal fourth-quarter loss as it excluded the results of its Palm Inc. unit and began dumping businesses. The networking-equipment maker's loss for the quarter ended June 2 was $146.8 million, or 42 cents per share. A year earlier, net income was $88 million, or 24 cents per share. Revenue from continuing operations dropped 38%, from $1.23 billion to $763.7 million. The company is focusing on small offices and consumers while exiting markets for dial-up modems and networking equipment for large organizations.

IBM Puts Up Pricey Help-Wanted Sign

IBM is expected to unveil new products and a $1 billion spending plan aimed at expanding its sales of software for Internet sites. IBM plans to hire 1,000 marketing professionals and sales staff within the next year.

Novell Launches Web Delivery Service

Novell Inc. last week introduced Novell Content Exchange, a service that will speed up delivery of all types of Web content. Content Exchange lets Web sites use a streaming-media delivery service like that of Akamai Technologies Inc. in Cambridge, Mass., without requiring modifications to the site itself. The service will initially be offered by GlobalCenter Inc., a Web hosting company in Sunnyvale, Calif.

Cost, Reliability Impede Wireless Device Adoption

Potential users also cite speed, security risks

BY JULEKHA DASH
NEW YORK

EVEN THOUGH mobile computing announcements took center stage at PC Expo here last week, attendees voiced their displeasure with the speed and reliability of wireless devices — problems that continue to impede the expansion of corporate applications.

For example, Frank Faras, vice president of engineering at Energy Photovoltaics Inc. in Princeton, N.J., said he believes a wireless network connection could help the company's 500 engineers communicate more effectively with the home office when they travel. The company manufactures products used to generate solar energy in factories worldwide.

Ideally, a wireless device would enable engineers to troubleshoot equipment or download factory diagrams without being tied to a hotel room or company office, said Faras. But wireless connections are still too slow, and mobile devices lack the bandwidth to download graphics or HTML code, he said.

Addressing the Issues

Vendors such as Palm Inc. in Santa Clara, Calif., announced plans to address some of these issues. Palm said it expects to support multiple expansion standards in its operating system and add additional storage capabilities by early next year.

Internet service provider GoAmerica Inc. in Hackensack, N.J., also announced at the conference that it has licensed Oracle Corp.'s wireless portal software. The companies claim that the partnership will allow workers to access corporate information from any mobile device.

However, some users said these actions don't address core infrastructure issues that still need to be resolved. "The infrastructure is still not there for wireless," said Tom Bachrach, a senior systems engineer at Salomon Smith Barney Inc. in Rutherford, N.J. Bachrach, who attended the show to evaluate messaging servers, said wireless messaging would be useful to the Wall Street brokerage in the event of a disaster: Employees could still exchange e-mail and do other work until Salomon's systems were up and running.

But that's a pie-in-the-sky application, said Bachrach. Although he acknowledged that handhelds are a fraction of the price of PCs, delving into mobile computing can still be a costly proposition because the products aren't mature.

Gartner Group Inc. in Stamford, Conn., has reported that although a personal digital assistant may cost only $450, the total cost of ownership — factoring in software licensing and service charges — can cost almost $3,000 per user per year.

On top of that, corporate customers also have to bear support and security costs, according to Mary McCarthy, an information services analyst at Bridgeport Hospital in Bridgeport, Conn. If it used handhelds, the hospital would not only have to train clinical staff on how to use the devices, she said, but it would also face a great risk in losing the equipment, because the facility is open to the public. ◗

PC EXPO ATTENDEES in New York listened to mobile computing promises, but some expressed dissatisfaction with wireless devices

United Puts Flight Info Into Hands of Palm

Airline joins Delta and American in offering PDA apps

BY MICHAEL MEEHAN

The Web site for United Air Lines Inc. went airborne last week for users of wireless-ready Palm personal digital assistants (PDA). User services at the world's largest airline sidestepped the middleman as part of its overall e-commerce initiative.

Chicago-based United's service will run a Java application that delivers free paging to inform travelers with PDAs of flight delays, cancellations and gate information via e-mail. Messages can also be sent automatically to a PC, text-enabled cellular phone or alphanumeric pager.

The service, called United Update, is the latest application for the airline's Palm-using customers, who were first able to check the status of their flights in May 1999.

Dan Black, United's director of e-commerce systems, said the company will soon add booking capabilities for Palm users, but telephone-based applications are United's priority.

"The phone will rule at the end of the day, simply because everybody has one," Black said.

Despite existing computer reservations networks such as those of Sabre Inc. and Galileo International Inc., which have debuted mobile links to their systems in recent months, Black said airlines can't allow middlemen to claim sole ownership of that territory.

"[Reservations systems] will only be able to handle tickets you purchase through them," he said. "We will always have product they can't access," such as special fares and certain nonrefundable tickets.

Delta Air Lines Inc. and American Airlines already offer similar packages.

"Delta's just way down the path on this stuff," said Peachtree, Ga.-based airline consultant Jeffrey Osborn. "I think everybody else is chasing them right now." ◗

United E-Lines

United Air Lines' efforts during the past year have been increasingly directed toward e-commerce. Major milestones include the following:

May 16, 1999 Offers flight status information on the Palm VII.

Jan. 13, 2000 Announces it will launch its own e-commerce and wireless subsidiary later this year.

Jan. 18, 2000 Unveils a new Web site and creates a flight-paging service that notifies travelers about delays, cancellations and gate information over a PC, cell phone or pager.

April 13, 2000 Forms a business-to-business e-commerce exchange with fellow Star Alliance airlines, including Air Canada and Lufthansa, which will go online to buy supplies for all carriers.

June 28, 2000 Announces beefed-up Palm capabilities that offer everything on its Web site except flight-booking.

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Citibank Calls It Quits for Online-Only Bank Service

Citi f/i to be incorporated into mainstream operations

BY MARIA TROMBLY

CITIBANK CONFIRMED last week that it has decided to close its online-only bank, Citi f/i, and to fold some of its features into the online arm of its regular banking service.

According to Citibank spokesman Mark Rodgers, a deadline for closing Citi f/i and incorporating it into the company's mainstream banking operations hasn't been set yet.

"What we're doing now is taking the best features of both of these services and combining them into one," he said.

Citibank has about 450,000 online customers, most of whom use Citibank's Direct Access service — not the standalone Citi f/i. Its customers are offered better prices on banking products but don't have access to Citibank's physical branches.

"Some customers are comfortable dealing with us on the Internet alone, and we will continue to offer them that option," Rodgers said. "But most clients also want the ability to tap into our financial centers."

Industry observers were divided on whether Citibank is doing the right thing.

"I would have liked to see [Citi f/i] continue," said Brook Newcomb, an analyst at Cambridge, Mass.-based Forrester Research Inc. "They really should stick to their guns on this."

Newcomb said independent online banks have an advantage over bank-affiliated Web sites because they can offer not only lower prices due to their lower overheads, but they can also offer products from a variety of vendors.

John Reed, who retired from his position as Citigroup Inc.'s chairman in April, recently told a gathering of financial industry executives that banks are not going to be able to survive in the new economy by integrating the Internet into their existing business models.

Instead, he said, companies should start new online ventures, hand over their brand names and customer lists and then stand back.

Citi f/i was one of Reed's projects. Another project he said he admired was WingspanBank.com, Bank One Corp.'s Internet-only venture.

"I thought it was a good idea," he said. "But it lost momentum."

Bank One CEO Jamie Dimon recently said he was exploring "all options" for WingspanBank, presumably including a spin-off or sale.

Although many question Citibank's move, others say they see Citi f/i as a failed experiment.

"Now, from an efficiency and effectiveness standpoint, the goal is to converge," said Lee Spirer, head of the financial services practice at Internet strategy firm Mainspring Communications Inc. in Cambridge, Mass. "To get more leverage out of the existing brand and platforms, the physical and online worlds have to merge."

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In Internet First, Wells Fargo Sued Over Alleged Racial Text on Site

Lawsuit claims bank steering customers clear of ethnic neighborhoods

BY MARIA TROMBLY

San Francisco-based Wells Fargo & Co. is re-evaluating its "community search service" partner Homestore.com Inc. after a Dallas-based organization sued the bank over what it called "explicit racial classifications and racial stereotypes of neighborhoods."

The lawsuit, announced on June 21, was filed in Federal District Court in Dallas and is the first federal lawsuit to allege racial steering over the Internet, according to the Association of Community Organizations for Reform Now (ACORN).

"It's bad enough that Norwest/Wells Fargo banks won't make loans to my neighborhood," said ACORN member and lead plaintiff Ruth Isaac. "But for them to use the Internet to steer people away is racial apartheid."

According to ACORN, Wells Fargo doesn't do business in Dallas minority areas. Moreover, the organization said the Wells Fargo Web site steered visitors away from certain neighborhoods based on race.

Wells Fargo immediately disputed the allegation that it is biased. It also quickly pulled the link to the offending material from its Web site after it received the complaint, according to company spokesman John Ferchen.

He said the complaint from ACORN was the first one the bank had received about the community search service, which is provided by Thousand Oaks, Calif.-based Homestore.com as well as Arlington, Va.-based CACI International Inc.

CACI said it will review in detail all of the descriptive information, and said that it "sincerely regrets" that anything on the system would have been viewed as discriminatory or insulting.

Wells Fargo said it has a history of positive relations with ethnic minorities and low-income borrowers.

Analysts say the ACORN lawsuit is a reminder to all online — and off-line — businesses that a company is not only responsible for its own actions but also for the actions of its partners.

"Nobody cares that Wells Fargo didn't create the content," said Jaime Punishill, an analyst at Cambridge, Mass.-based Forrester Research Inc. "As far as customers are concerned, it came from Wells."

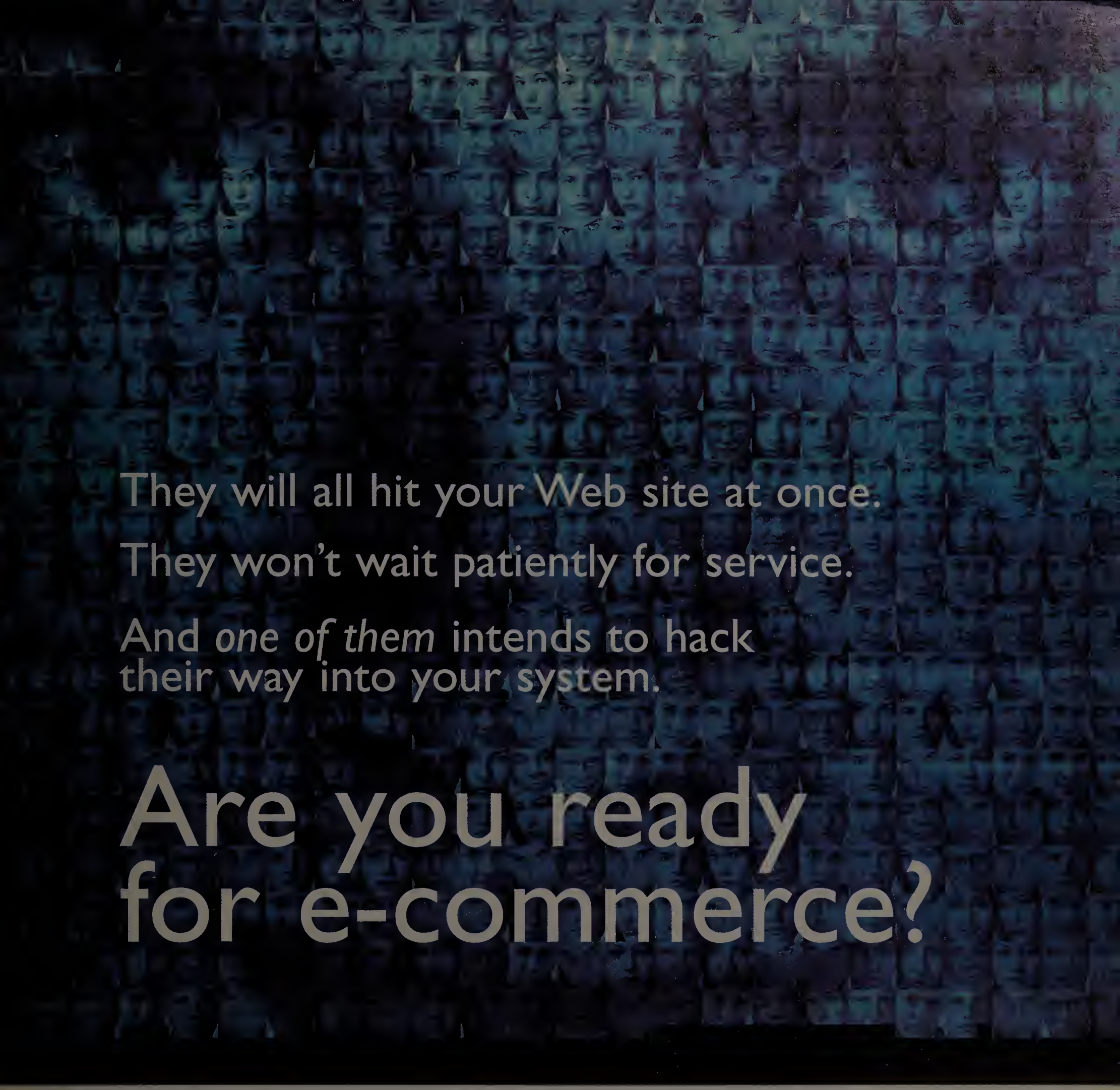
AT A GLANCE

Offensive Links

After complaints, Wells Fargo partner Homestore.com changed these descriptions of low-income neighborhoods:

- **Distressed:** "They splurge on fast food and chicken restaurant take-out."
- **Low Income:** "This market ranks high for using pest control services."
- **Middle Class Urban Families:** "They are top-ranked for owning 4+ televisions and for drinking wine coolers and cola sodas."

SOURCE SNAPSHOTS OF WELLS FARGO PAGES STORED BY ACORN



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Uncertainty Surrounds Microsoft's .Net Plans

Users looking for answers to questions about pricing, security, product support

BY DOMINIQUE DECKMYN

MICROSOFT Corp.'s initial presentation of its .Net vision raised many questions — such as how the new online software services plan will affect the future of Windows 2000 and Distributed Component Object Model (DCOM) and how its new Internet services will be licensed. Some users are hoping to get answers at next week's Professional Developers Conference (PDC) in Orlando.

.Net is described by Microsoft as a platform for next-generation Internet applications. It will include new development tools, such as Visual Studio.Net; a new user interface, called the .Net User Experience; and Microsoft-hosted "building-block services," including Identity and Personalization, all to be delivered over the next two or more years.

Industry analysts said Microsoft must prove that developing applications using .Net will be faster and easier than other approaches such as Enterprise JavaBeans. That will in large part depend on the tools Microsoft is expected to demonstrate to developers at PDC: Visual Studio 7, which is due next year, and a future follow-up called Visual Studio.Net.

Also at issue is the fact that Microsoft has given no indication of how it will price its hosted building-block services. "If a developer can get the work done faster by using a .Net service, that's a great advantage for him," said Sam Patterson, CEO of ComponentSource Inc., an Atlanta-based online marketplace for software components. "[But] corporations need to know what this will cost them."

Others worry about the security implications of depending on Microsoft-hosted services. But Gene McNair, electronic-business systems administrator at Schneider Automation Inc. in North Andover, Mass., said he would consider using Microsoft's proposed identity service for his company's Web site aimed at partners and customers. "It's not really conceptually different from going to VeriSign for digital certificates," McNair said.

Future Considerations

Another uncertainty is the fate of Microsoft technologies such as DCOM, which some say is largely superceded by Simple Object Access Protocol (SOAP), the Microsoft-driven proposed standard for program-to-program communication that is to be the "glue" between various .Net services.

Microsoft is "de-emphasizing COM," said James Kobielus, an analyst at The Burton Group in Alexandria, Va. "Very few people are using DCOM for the Internet." But Dwight Davis, an analyst at Boston-based Summit Strategies, said Microsoft is unlikely to abandon developers who have already chosen DCOM.

ComponentSource Inc. is experimenting with SOAP.

"We're seeing no scalability or performance problems," said Patterson. But he also said that Microsoft needs to explain when .Net will be ready for use in a production environment.

Also worrisome for some users is that, although several hardware vendors, including Compaq Computer Corp. and Round Rock, Texas-based Dell Computer Corp., were present at the .Net launch, few software developers or corporate users have so far stepped up to endorse the concept.

"Microsoft would have done better to pull together a consortium before they announced this," said McNair.

Some question Microsoft's commitment to open standards. "It will be real interesting to see at PDC whether they will open-source a runtime for .Net, to see how open they are going to be," said Evan Quinn, an analyst at Hurwitz Group Inc. in Framingham, Mass. "I have a suspicion that Microsoft is going to try to out-open Sun," he added. But Deepak Amin, CEO of application service provider vJungle Inc. in Bellevue, Wash., said Microsoft might also reverse course. "I wouldn't bet my future on anyone's open approach in the future — not Microsoft, not anyone," Amin said.

Hovering over .Net's future is the fate of Microsoft itself. "Adoption may be a little slower because of the DOJ case," said Dave Smith, an analyst at Gartner Group Inc. in Bedford, N.H. But he said he believes the .Net strategy may help a post-breakup applications company. "In a post-breakup scenario [.Net] is likely to be the core of the applications company," said Smith, who added that he expects a Windows operating system company to "effectively atrophy."

Because of the many blanks in the .Net plan, "it will be four years before an enterprise would look at this as a viable platform for its enterprise computing needs," predicted William Hurley, an analyst at The Yankee Group in Boston.

Windows to Split in Two – Again

Microsoft's recently announced Windows.Net will add yet another "flavor" of Windows 2000 to an already fast-growing family. But details on the new operating system are sketchy.

While .Net services can be accessed from multiple devices, including Web browsers and even Wireless Application Protocol phones, Windows.Net will provide a richer interface for those services, executives have said. Windows.Net 1.0 will ship next year.

Windows.Net will have application programming interfaces (API) that "will basically be an extension of the Win32 interfaces, with additional services delivered via the Microsoft.Net platform," said John Fredriksen, general manager of Microsoft's PC experience solution group, in an e-mail interview.

Current applications will run on Windows.Net, while applications that use .Net services will be written to the new APIs.

The API extensions suggest that Windows.Net may be more proprietary than what Microsoft tried to suggest last week.

"After making substantial investments in going to Windows 2000, I don't see enterprises rushing out to do this," said William Hurley, an analyst at Yankee Group.

Deepak Amin, CEO of application service provider vJungle Inc., added that "it will be at least 2.0 if not Version 3.0 before [Windows.-Net] is stable and usable. That's a good two to three years out. That's too far in the future to bet on today."

Gene McNair, electronic-business systems administrator at Schneider Automation, said a 2001 release of Windows.Net wouldn't change his company's plans to start migrating to Windows 2000 by the end of this year. "There are too many things that are attractive about Windows 2000," such as its IntelliMirror feature, he said.

Microsoft said it will continue to release versions of Windows without the .Net component. That means 2001 will not only see the launch of separate professional and consumer versions of Whistler (the follow-up to Windows 2000 and Windows Me) but also Windows.-Net and non-Windows.Net versions. Combined with upcoming 64-bit releases, the total number of Whistler variants on the desktop alone could mount to five or six.

In 2002 or later, Microsoft will ship a Windows.Net server product, about which even less is known. "It's Windows 2000 repackaged and tweaked for the service provider market," suggested James Kobielus, an analyst at The Burton Group. – *Dominique Deckmyn*

Microsoft Taking Standards Route

Microsoft last week submitted its newly announced C# language as a specification to an international standards body, a move users say is a must amid growing platform interoperability woes and concerns about the breakup of the software giant.

The company unveiled C# (pronounced "C sharp") last Monday, claiming that it will make it easier for C and C++ developers to create objects that run on the new Microsoft.Net infrastructure and interoperate with other platforms and applications through Web services.

James Nickson, a C++ developer and consultant in Chesterfield, N.H., voiced skepticism about "another quasi language" emanating from Microsoft and about whether C# will solve interoperability problems, because little detail has been provided about which types of objects and classes it will support.

But Microsoft hopes to assuage such fears by pledging to make C# a standard, thereby giving developers an extra incentive to learn it.

"Microsoft wants to use the standards process to . . . further the proliferation of the language," said Jan van den Beld, secretary general of Geneva-based standards consortium ECMA. Van den Beld said he has no concern that Microsoft will abort the standards process, as Sun Microsystems Inc. did last summer.

Sun had long promised to make the Java programming language an open standard but withdrew from the ECMA process last summer, citing concerns about intellectual property rights.

– *Lee Copeland*

.Net Road Map

Microsoft laid out a two-year .Net road map ...

	TODAY	2001	2002
User experience	Tech preview	Windows.Net 1.0	Full .Net UE
Infrastructure and tools	XML in servers BizTalk Server (beta)	Visual Studio 7	Windows.Net Server
Building blocks	Passport	Three or four key services	Full offering
User services	Service experience	bCentral, MSN, Subscription service	Office.Net, Visual Studio.Net

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BRIEFS

EMC Levels Charges at StorageNetworks

StorageNetworks Inc. disclosed that it's in a dispute with EMC Corp., its largest supplier and a leading customer. Waltham, Mass.-based StorageNetworks said it received a letter from Hopkinton, Mass.-based EMC, in which the computer storage company accused StorageNetworks of misappropriating EMC's confidential information, violating an agreement not to hire EMC employees and misrepresenting that EMC is a StorageNetworks investor.

Web Costs Could Stall Mobile Phone Growth

Stockholm-based LM Ericsson Telephone Co., the leading maker of wireless-network equipment, said its growth may slow because of the high prices European phone companies must pay for permits to offer fast Web browsing and video on mobile phones. The costs are set to top $100 billion in Europe.

Conexant Bids to Boost Net Portfolio

Chip maker Conexant Systems Inc. said it plans to acquire closely held HotRail Inc. in San Jose, Calif., for about $394 million in stock. Newport Beach, Calif.-based Conexant said the acquisition would allow it to expand its Internet-related offerings for use in gear such as multiterabit routers, Internet Protocol switches, Gigabit Ethernet switches and optical-networking equipment.

HP Offers OpenView for Linux/Apache

Information technology managers who want to manage and monitor a Linux/Apache Web server may want to check out Hewlett-Packard Co.'s OpenView Express 2.0, set for release later this month. Express 1.0 was HP's fixed time and cost (three weeks and $26,795) OpenView implementation for Windows NT. In Version 2.0, HP offers management of the open-source Linux operating system and Apache server software through an alliance with Dirig Software Inc. in Nashua, N.H.

Chat Clients May Pose Security Threats

Experts advise limiting use of messaging services

BY JAIKUMAR VIJAYAN

INTERNET CHAT CLIENTS such as instant messaging applications pose a serious security risk for corporations, according to an advisory issued by Carnegie Mellon University's Computer Emergency Response Team (CERT).

It's therefore better for companies to limit their use or even disable the functionality of such applications unless they're absolutely needed for business reasons, according to several security experts.

Examples of messaging software include America Online Inc.'s Instant Messenger and Microsoft Corp. and Yahoo Inc. chat software.

Chat clients and Internet Relay Chat (IRC) networks are coming under scrutiny in the wake of recent viruses like the I Love You and Life-Stages bugs. Both were programmed to take advantage of instant messaging software and chat rooms to spread themselves rapidly across computers and networks.

Chat clients "pose a serious security risk to corporations," particularly in cases where an individual or company is being targeted by a cracker, said Ryan Russell, an MIS manager at SecurityFocus.com, an online bulletin board and security portal in San Mateo, Calif.

"Enterprises should evaluate the need to provide access to chat and instant messaging facilities," said Chad Dougherty, a CERT member.

One user wasn't convinced. "I'm sure there are some legitimate threats," associated with the use of such software, said Matt Kesner, CIO at Fenwick Ampers and West, a law firm in San Mateo, Calif. But so far at least, his company has seen little direct evidence of that, he said. For instance, although the firm was recently plagued by the I Love You bug, "not a single copy appeared to have come from a chat client or IRC [network]," Kesner said.

CERT's advisory, posted at *www.cert.org/incident_notes/IN-2000-08.html* last month, followed inquiries from users about the threat posed by chat clients, Dougherty said.

"The security problems that can be found in these systems are basically of the same kind that plague e-mail" software, Dougherty warned, saying flaws in chat client software, for instance, could be relatively easily exploited by crackers to plant and launch malicious code in corporate networks.

Similarly, users could be tricked into communicating sensitive information or downloading files containing malicious code via chat clients, Dougherty said.

"One major risk we have seen is people having their instant messenger identities stolen without their knowledge," Russell said. That can make it easy for crackers to fool victims into sending them files and information, he said.

All information exchanged via instant messaging clients and chat rooms travels over public networks that can be relatively easily intercepted or read by crackers, Russell said.

Compounding the problem is the easy availability of tools for password cracking, identification spoofing, message interception and message rerouting, said Andre Mintz, an analyst at Meta Group Inc. in Stamford, Conn.

"There are utilities out there that let any 13-year-old sit in the [middle of a conversation] and watch traffic go back and forth," without anybody ever knowing, Mintz said.

Users must realize that chat software "was definitely not meant for secure information exchange," Mintz said. ◗

CERT's Advisory on Chat Clients And Networked Security

Issue: Software flaws such as buffer overflows and insecure configurations may be present in client software, making it vulnerable to attack.
Advice: Review chat software configuration, check security settings and have work-arounds or patches.

Issue: Social engineering attacks may entice users to share sensitive information or launch unwanted applications.
Advice: Use caution in releasing information and executing untrusted software.

Issue: Information such as passwords may be passed across untrusted networks in clear text.
Advice: If available, strong encryption should be used to secure sensitive communications.

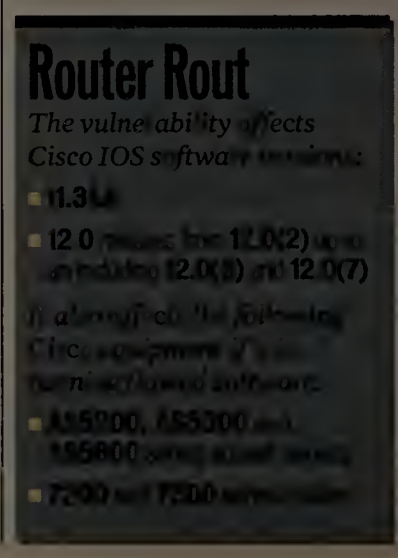
Cisco Router Software Glitch Opens Security Hole

BY ANN HARRISON

A defect in several versions of Cisco's Internetworking Operating System (IOS) can cause routers to crash when they are tested for vulnerabilities by security scanning software.

According to an advisory issued by Cisco Systems Inc. in San Jose, the defect can be exploited to produce a consistent denial-of-service attack that could shut down all or parts of a user's site. The vulnerability can be exploited only if the Telnet service, which allows direct terminal connections between a user and host computer on the Internet, is configured on the affected system and reachable from the attacker's computer. Users running Cisco IOS software versions 11.3AA, 12.0(2) up to and including 12.0(6), and 12.0(7) are vulnerable with the exception of 12.0(7)S, 12.0(7)T and 12.0(7)XE, according to the advisory.

"The company that delivers most of the plumbing for the Web is trying to avoid people going down the tubes as a result of their dependency on potentially leaky plumbing," said Eric Hemmendinger, an analyst at Aberbeen Group Inc. in Boston.



The vulnerability affects Cisco AS5200, AS5300 and AS5800 series access servers and 7200 and 7500 series routers if they are running flawed software.

"Customers using the affected Cisco IOS software releases are urged to upgrade as soon as possible to later versions that aren't vulnerable to this defect," the advisory stated. Customers without upgrade contracts can obtain free upgrades via the Cisco Technical Assistance Center.

Karen Gibbons, public relations manager for Cisco's IOS technologies division, said the advisory was posted in April, soon after the vulnerability was discovered. The company has had no reports of customers or partners experiencing denial-of-service attacks as a result of the hole.

Because not all of the affected software releases have been patched, the company is directing users to the suggested work-arounds listed at *www.cisco.com/warp/public/707/iostelnetopt-pub.shtml.* ◗

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FOUNDRY NETWORKS

Online Transport Exchanges in Motion

Mergers, targeted fee plans emerge in chaos

BY LINDA ROSENCRANCE

CONSOLIDATION is well under way in the nascent world of online transportation marketplaces. But offering the right services for the best price remains a competitive advantage for targeted markets.

Logistics.com Inc. in Burlington, Mass., and QuoteShip.com Inc. in Boston merged last week to form a transportation marketplace that covers all modes — land, air and sea — worldwide. Previously, Logistics.com specialized in land services, while QuoteShip.com served the air and ocean markets.

But with new Web-based transportation exchanges — which match up shippers and their freight with transportation providers and their trucks, trains, planes or ships — popping up almost weekly, picking the right online marketplace is almost as important as choosing the right carrier.

Paul Killebrew, international marketing manager at Airborne Freight Corp. in Seattle, said his firm had been planning to sign up with QuoteShip.com before the merger announcement. Now, he said, his company will join the electronic marketplace created by the merger.

"We liked their model out of all the [online exchanges] because they took into account the already existing relationships between the shippers and carriers," he said. "They allow a shipper to choose the carrier they would like [to do business with] from the carriers which have signed up with them."

Although Logistics.com may well be the first online marketplace to offer its services across all modes of transportation for both contract and spot transactions, analysts said that there doesn't seem to be much to distinguish any of the other Web-based exchanges.

Donald Broughton, an analyst at A. G. Edwards & Sons Inc. in St. Louis, said that, ultimately, only those that bring pre-existing relationships to the virtual world will survive.

"There are dozens of logistics exchanges," he said. "But when it all sorts itself out, there will only be a couple of dominant players — players that already have relationships with [shippers or transportation providers]."

Broughton said he believes Transplace.com in Plano, Texas, will be among the leaders. It was formed by the merger of the logistics units of the six largest publicly held trucking companies, including Covenant Transport Inc. in Chattanooga, Tenn., and J. B. Hunt Transport Services Inc. in Lowell, Ark.

"While it's not a huge segment of the trucking industry, it does give them a real competitive advantage because of the relationships they already have with shippers," Broughton said.

Fees Matter

Gary Nichols, director of dedicated fleet services at Contract Freighters Inc. (CFI), a trucking company in Joplin, Mo., said that although his company had researched various online exchanges, it was testing the online marketplace set up by CarrierPoint Inc. in Atlanta in part because of CarrierPoint's fee structure.

"CarrierPoint does not assess a fee to the shipper or carrier unless a transaction is completed," he said. "Other online exchanges charge a fee as soon as contact is made between the shipper and the carrier, and that fee is still due even if they back away from the transaction."

However, he added that small and midsize carriers would probably benefit more than a larger carrier like CFI, whose customers prefer service to the savings that might be generated by participating in an online exchange.

Robert Obee, vice president and CIO at Roadway Express Inc., an Akron, Ohio, trucking company, said he likes Kansas City, Mo.-based Freightquote.com because it understands how less-than-truckload transportation is bought and sold. ◗

Transportation Marketplaces

Logistics.com Formed by the merger of Logistics.com and QuoteShip.com. Serves shippers and carriers worldwide over land, air and ocean for contract and spot markets. Based in Burlington, Mass.

Carrierpoint.com Digital marketplace for the trucking industry based in Atlanta. Covers less-than-truckload (LTL) and truckload shipments.

Transplace.com Internet-based global transportation logistics company founded by six U.S. trucking companies for truckload, LTL, refrigerated, intermodal and air shipments. Based in Plano, Texas.

Transportation.com Launched last week by Yellow Freight in Overland Park, Kan. Offers transportation-management and consulting services as well as back-office support.

Freightquote.com Online marketplace for domestic LTL services, based in Overland Park.

Continued from page 1

Harry Potter

York-based Scholastic Inc., revealed the title — *Harry Potter and the Goblet of Fire*.

That set off a chain of events at Seattle-based Amazon.com, which has received more than 275,000 orders for the book.

"Among other things, we had to quickly change all of the places 'Harry Potter IV' appeared on our Web site," said Lyn Blake, general manager of the online bookstore. "It sounds easy, but there's a lot involved in making that happen."

Amazon has been working closely with Memphis-based FedEx, which will ship the books from Amazon's six distribution centers. For the first 250,000 who ordered the book, Amazon is offering free Saturday delivery, ensuring a July 8 arrival.

To ship all the Amazon orders, FedEx will use 100 flights and 9,000 delivery workers out of 700 stations. It has also placed computers and FedEx information technology workers on-site at Amazon's distribution centers. Orders for the book have been astronomical — six times more than Amazon's former largest preorder of 43,000 copies of John Grisham's *The Brethren*.

"There is a ton of work going on behind the scenes from an IT standpoint," said Dottie Berry, FedEx vice president of customer integrated technologies.

For the past week, FedEx and Amazon have been checking data quality to ensure they have correct shipping addresses for preorders.

"We e-mailed all of our preorder customers and told them to go back and check their shipping address, since FedEx can't ship to a PO box. Customers then came back to our Web site and confirmed their address," said Blake.

Amazon also had to change its shipping and billing processes and systems. Usually, Amazon bills customers' credit cards as soon as their orders are picked, packed and sent out from one of its distribution centers. But in *Harry*'s case, Amazon has been prepackaging early orders at the centers, while waiting to bill customers' credit cards until the books are shipped out at precisely 12:01 a.m. on July 8.

"This has required a work-around change in our software," Blake said.

But analyst Stacy McCullough at Cambridge, Mass.-based Forrester Research Inc., said that though the Potter shipment presents certain challenges, it's easier to prepare for than the holidays. "I think with this type of shipment, while it is very large . . . it's easier to handle than a mad rush on all the products," she said.

Meanwhile, Borders is capitalizing on Pottermania to drive traffic from its Web site to its 300 brick-and-mortar stores, and vice versa.

Customers who preordered the book online for home delivery will receive coupons for Borders' cafés and other in-store discounts.

Meanwhile, all of the brick-and-mortar stores are hosting special Harry Potter events such as midnight release parties, many of which are being filmed for video broadcast on the Borders.com Web site. The company has teamed with Centerseat Inc., a New York-based digital production company, for the Web broadcasts.

Visitors to real-world stores will also receive a special "decoder" gadget that they can hold up in front of a certain page on the Borders Web site to reveal the solution to a special Harry Potter riddle.

"There's a mania surrounding the release of this book, and anything to do with Harry Potter is getting massive traffic," said Fahle. ◗

THE JULY 8 RELEASE of the new Harry Potter title has online bookstores and shippers in a frenzy

Staff intern Meghan Holohan contributed to this report.

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Challenges Ahead for Microsoft Support

New applications, possible breakup provoke doubts despite improvements

BY DOMINIQUE DECKMYN AND CHRISTINE McGEEVER

JUST WHEN Microsoft Corp. customers thought it was safe to call on the company for enterprise-level technical support, the vendor is facing a double challenge: support for newly sophisticated electronic-business applications and the court-ordered split. That situation has customers who are satisfied wondering if they will stay satisfied for long.

Microsoft Product Support Services has been struggling for years to rid itself of a reputation for shoddy support and now is trying to add enterprise-level services to stimulate adoption of Windows 2000.

"They've come light-years in just the last two years," said Ron Griffin, senior vice president and CIO at The Home Depot Inc. in Atlanta. "They are becoming much more focused on the needs of the enterprise."

"They respond quicker," agreed Steve Sommer, CIO at New York law firm Hughes Hubbard & Reed LLP, which has 1,100 desktop PCs.

Some of that improvement can be attributed to service initiatives launched last year, such as the Alliance and Premier support programs. Those programs offer benefits such as consultants who are dedicated to companies in the programs, like Hughes Hubbard & Reed.

Consulting Unit Wins Praise

Also making strides, users said, is Microsoft Consulting Services (MCS), a separate unit that typically helps customers implement new Microsoft technologies, often in tandem with partners whose consulting expertise extends beyond Microsoft products.

"They've been able to get really good people and train them well on Microsoft products," said Griffin. "But if you're a Fortune 50 company, you need people who can tie in to myriad environments."

Nevertheless, difficulties lie ahead. Besides the antitrust case and whatever disruptions or changes that eventually may bring, Microsoft still needs to add expertise in the technologies the company is touting in its newest products.

Adoption of Products Slowed

For example, skills in Windows 2000 Active Directory remain hard to find, and that's forestalling adoption of Active Directory, according to Joe Clabby, an analyst at Aberdeen Group Inc. in Boston. Microsoft's recent move into electronic business, with upcoming server products such as BizTalk Server and Commerce Server, will only increase the skills gap, he added.

Sommer said he has had good experience with MCS and is interested in using new Microsoft technologies such as DNA 2000 to build e-business applications. However, he said, Microsoft has to work more closely than it has with big companies on development and integration projects.

In response to such needs, Microsoft in March joined with Andersen Consulting to create Avanade Inc., a consulting company that will help companies build e-commerce applications on Microsoft platforms. And at Tech Ed in Florida earlier this month, Microsoft announced that it would invest $2 billion over the next three years to train developers in electronic-business skills such as XML.

Lori Moore, vice president of support and services at Microsoft, said the company is also adding other — as yet undefined — programs that will combine Microsoft's product support with consulting services from Microsoft Professional Services, which today is a separate organization.

"THEY'VE COME light-years," says Home Depot's Ron Griffin

She offered no details on those programs but did say they would likely be launched in the first half of next year.

Meanwhile, there's the threat of the breakup. Aberdeen Group recently estimated the total cost of the Microsoft breakup to the U.S. economy at $43 billion, much of which would come from the additional integration work Fortune 500 companies will need to perform, said Clabby. A Fortune 500 company will have $2 million in additional integration costs each year to make sure the operating system, directories and applications work together seamlessly, he predicted.

"Even if they get broken up, I'm sure [products] would work together," said Bart Fitzgerald, vice president and CIO at Central Programs Inc. in Bethany, Mo. "But we'd be less inclined to go out on the bleeding edge. Right now, I feel comfortable rolling out SQL Server 2000 close to the release date. If it's a separate company, I'd be more reluctant."

Multiple XML Repositories Raise Standards Concerns

Schema variations predicted, feared

BY CAROL SLIWA
NEW YORK

The multiple repositories being set up to store the XML schema that businesses will need to exchange data with one another left some end users confused and concerned last week at the XML DevCon show here.

The Organization for the Advancement of Structured Information Standards (OASIS), a nonprofit consortium in Billerica, Mass., last week announced that more than 20 organizations have registered to submit XML schemas, Document Type Definitions (DTD) and supporting documentation with its XML.org Registry. Major vendor sponsors and contributors include Oracle Corp., Sun Microsystems Inc., Documentum Inc. and IBM.

But that XML.org Registry is similar in nature to the schema repository that Microsoft Corp. established last year as part of its BizTalk e-commerce initiative.

Microsoft product manager David Turner said more than 150 member organizations participate in BizTalk and more than 500 schemas have been published to BizTalk.org.

And beyond BizTalk.org and XML.org, there are other repositories in the works. One vendor, XMLGlobal Technologies Inc. in Seattle, is even developing tools to help industries or companies create their own schema repositories.

'Converge, Not Diverge'

"My fear is there are just going to be slight variations, if history is any indication," said Daniel Paolini, manager of enterprise initiatives for the state of New Jersey's CIO. "The whole point is to converge, not diverge."

"I'm dealing with about four different repositories right now that I'm being asked to take a look at," said Michael Cipoletti, a technology manager at Osram Sylvania Inc. in Danvers, Mass., citing the potential for differing purchase orders in multiple repositories. "If you look at BizTalk.org, it's being flooded with proprietary schemas, and they really have no value whatsoever."

Microsoft, OASIS and other repository hosts don't aim to define purchase orders or any other business document types. They merely want to serve as public clearinghouses for the schemas and vocabularies that industry organizations devise for business-to-business data exchange.

OASIS Executive Director Laura Walker said she expects there eventually will be many interoperable repositories for XML schemas and DTDs.

Turner said that's one possible scenario, but he added that he's not sure how it would work. "I couldn't tell you right now what our definitive plans for BizTalk.org are," he said.

Clearinghouses

Repositories are being set up to serve as central clearinghouses for XML schemas, specifications and vocabularies. They include:

BizTalk.org
- **Site host:** Microsoft
- **Launch date:** September '99
- **Number of member organizations registered to submit schemas:** More than 150

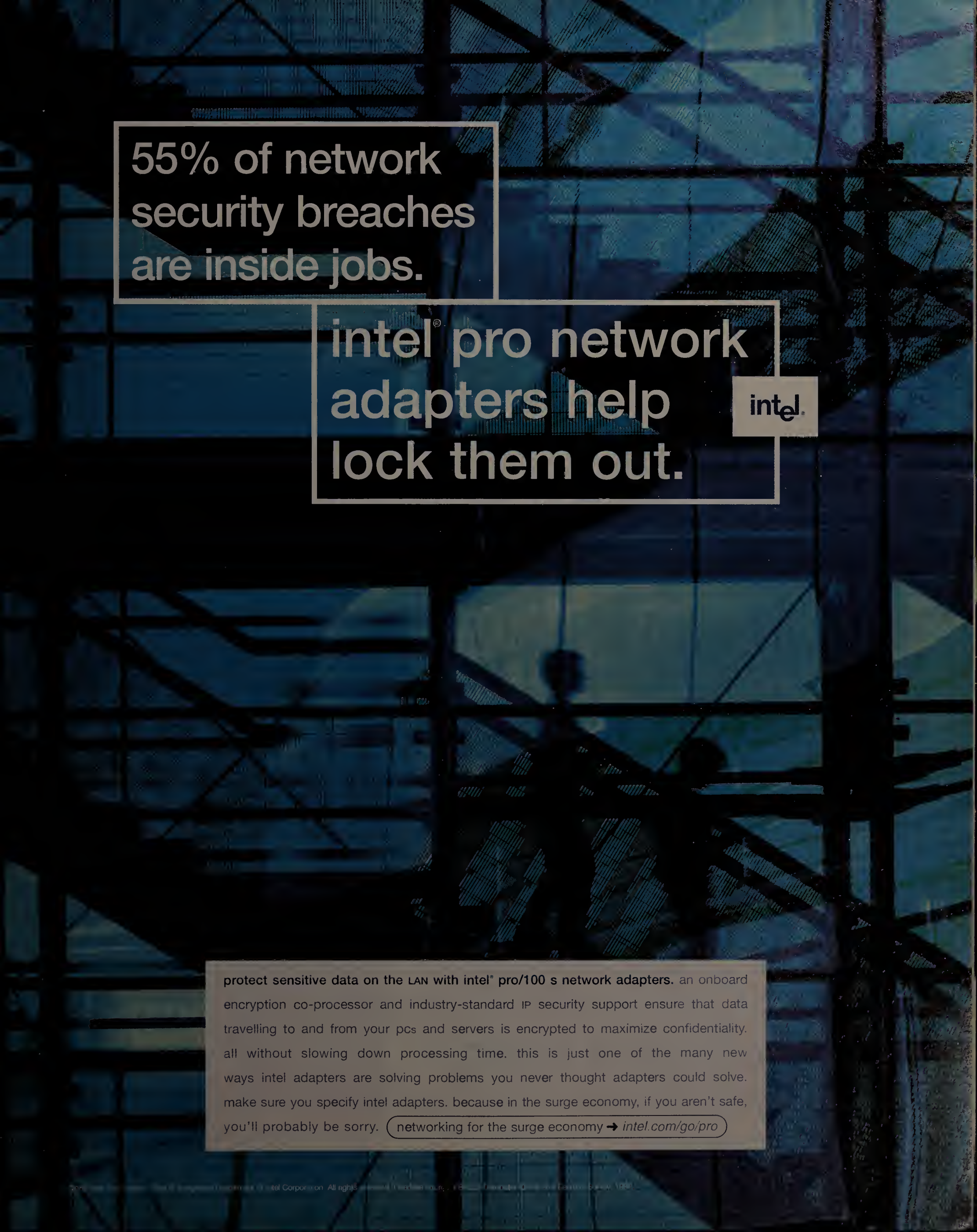
XML.org Registry
- **Site host:** OASIS, with equipment from Sun, iPlanet, Oracle and Documentum
- **Launch date:** June 20
- **Number of industry/member organizations registered to submit schemas:** 20

Microsoft Claims Commitment

Microsoft is a member of OASIS but didn't sponsor XML.org because it "didn't see a value in investing $100,000 in it," said Turner.

BizTalk member organizations currently must submit a schema in a special format that Microsoft developed, but Turner said Microsoft has "a full commitment to migrating to and supporting" the World Wide Web Consortium's XML schema specification once it's ready. Any schemas residing in BizTalk.org will then be converted to conform to the XML schema spec, Turner said.

"What's important is the standard, and Microsoft, at least with its words, is committed to the standard," said Steve Garone, an analyst at International Data Corp. in Framingham, Mass.



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Transporters Move to Deliver on E-Commerce

Shift from mainframe to Web environment aims to sharpen customer focus

BY LINDA ROSENCRANCE
LAS VEGAS

IT'S A FACT: E-commerce is changing the way the transportation industry does business. The question, though, is how effective the industry will be in managing the change without losing sight of its primary function — to deliver goods to customers.

The change is a fundamental one, involving a shift from mainframe systems and the use of electronic data interchange (EDI) to a Web-enabled environment designed to be more customer-centric.

CANADIAN NATIONAL RAILWAY has been using EDI for 20 years

Industry decision-makers gathered at the E-commerce for Freight Transportation conference here last month to discuss how to take advantage of the Web and e-commerce-related technologies to deliver goods more efficiently.

"Moving things along is really the point of this conference," said John Meredith, group managing director at Hutchinson Port Holdings Ltd. in Hong Kong, a global port investor, developer and operator.

Meredith contends that the transportation industry has lagged behind in the e-commerce revolution. Part of the reason, he said, is fear of technology that could improve the way the industry does business and fear of losing control of proprietary information.

Charles Beard, managing director of transportation electronic solutions at KPMG Consulting LLC in McLean, Va., said he agreed, noting that the shift from mainframe-based systems to Internet-based ones isn't just a technology or a business problem.

"It's an emotional issue [for carriers] to go from an EDI-operated model to an Internet model, because opening up your operational system to the Internet is very scary," Beard said. "With EDI, you know who you're connected to. You make physical contact with your transportation partner off of dedicated circuits."

Execs See Web as Inevitable

But transportation industry executives acknowledge that the transition to Internet-based systems is inevitable.

Debbie Pullman, manager of e-business at Canadian National Railway Co. in Montreal, said the railroad has been using EDI for 20 years, and some of its customers have invested heavily in the technology.

But with the awareness that many of its customers are already doing business over the Internet, and the conviction that the rest will inevitably follow, Pullman said Canadian National has seized upon XML to define data elements in documents as a means of improving its interoperability with customers.

Middleware is another enabling technology that eases the pain and expense of switching to an Internet-enabled system, Beard noted.

"With middleware, you can leave the legacy system intact and code the business rules — how you deal with customers — in the middleware layer," Beard said. "You don't have to rip out and rebuild the entire system."

Mark Davis, assistant vice president of e-business at Union Pacific Corp. in Omaha, said there's no one-step means of converting from a legacy system to a Web-based one. But middleware helps.

"One of the ways [we] did it was to put architecture in place built on BEA Systems Inc. Tuxedo software," he said.

San Jose-based BEA's Tuxedo transaction platform is the middleware that links Union Pacific's warehousing, sales and accounting systems, which reside on different hardware and operating system platforms.

"We used messaging [middleware] software to drive the information on the legacy system and put it on the Web front end," he said. "You don't have to change your legacy system; you can integrate it" into a Web-enabled system, he said.

But although migrating from a mainframe system to an Internet-based one is essential to survive in the e-commerce economy, it's also important not to get too caught up in the Web-enabling technology, said Don Liedtke, CIO at APL Ltd., an ocean transportation company in Oakland, Calif.

"It's not about browsers, it's about information exchange," Liedtke said. "And it's not about Web-enabling traditional industry processes; it's about using technology to redefine the way business is done. The key is what's behind the interface." And behind the interface is the customer.

It's All in the Execution

According to Robert Obee, vice president and CIO at Roadway Express Inc. in Akron, Ohio, the main point behind the shift to Web-based systems is to provide customers with all the accurate information they could possibly want or need. That includes service information and price quotations, pickup requests and confirmations, shipment tracking, delivery confirmations and postdelivery services such as document retrieval, billing and claims.

When carriers extend their applications onto the Web, they have to use the technology to make it easier for their customers to do business with them, said John Fontanella, an analyst at AMR Research Inc. in Boston. "Major carriers are already doing this," he said. "But midsize and small carriers should also be doing it."

KPMG analyst Scott Rosenberger had this advice for transportation providers: Make it easier for customers to get the information they need, and they will keep coming back.

APL, for example, gives its customers access to instant help: It allows customers to chat live — 24 hours a day on weekdays — with APL customer-support representatives, giving customers real-time assistance with questions or problems, Liedtke said.

Bob Davidson, vice president of marketing and pricing at ABF Freight System Inc. in Fort Smith, Ark., said his company, which also offers live chat with service representatives, lets customers use its Web site to reroute a shipment in transit; request and schedule pickup; review the charges on a freight bill and request changes, if necessary; and file or review the status of loss and damage claims.

Keeping customers happy is the bottom line, transportation executives said.

Ken Chih, director and CIO at Orient Overseas Container Line (OOCL), a global container transportation company in Hong Kong, said that in the new economy, customers are in the driver's seat.

"This is a customer-driven market instead of vendor-driven," Chih said. "That's the difference between the industrial revolution and the information revolution."

Why the Internet?

- To provide better customer service
- To improve information sharing
- To lower the cost of doing business
- To improve process efficiency
- To enhance global opportunity
- To enhance supply-chain and demand management

SOURCE: ORIENT OVERSEAS CONTAINER LINE

CIO KEN CHIH of OOCL says transportation is a customer-driven market

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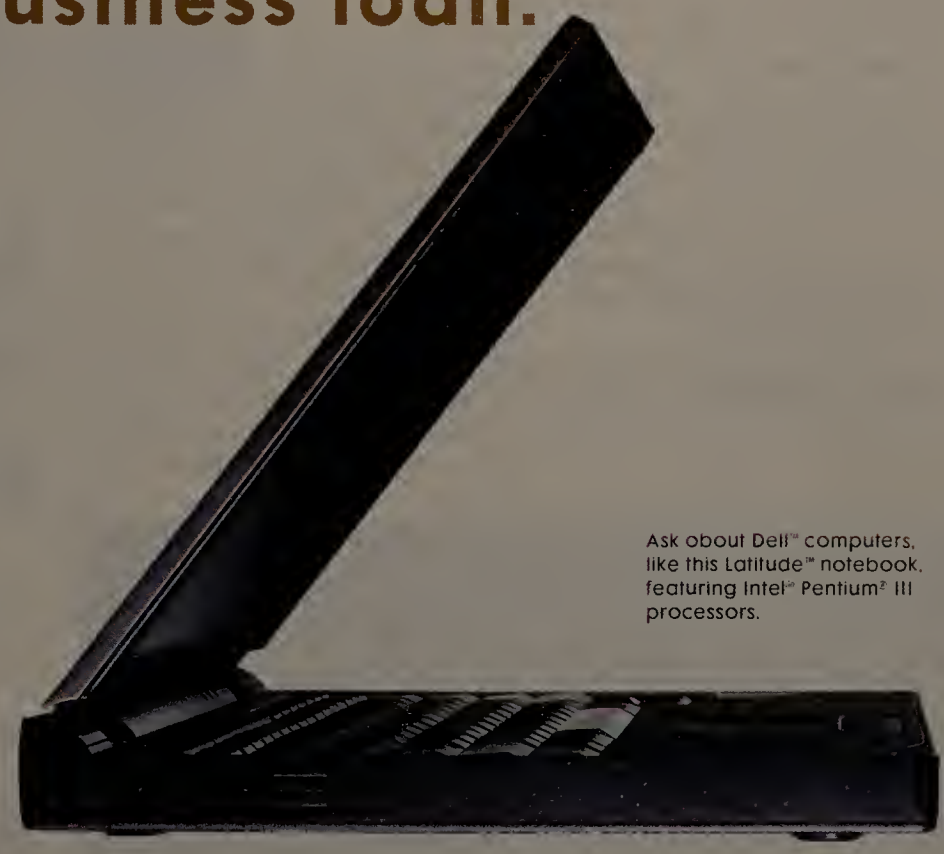

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BSA Takes a New Tack In Fight Against Piracy

20 companies settle as part of Piracy Sweeps Week

BY TODD R. WEISS

FIRING A WARNING SHOT at businesses that use software without paying for it, the Business Software Alliance (BSA) last week announced $2.4 million in software piracy settlements with 20 companies.

The individual settlements were announced as part of the Washington-based vendor group's first annual Software Piracy Sweeps Week.

Bob Kruger, the BSA's vice president of enforcement, said that although similar settlements are made year-round, the group decided to announce 20 of them in one week to highlight the costs and prevalence of software piracy within businesses across the nation.

Located in 11 states, the 20 businesses include a diverse mix of companies, from a vacation resort in Miami to a mortgage company in Kenilworth, N.J. Also included are a software developer in Herndon, Va., and an electronics and telecommunications manufacturer in Horsham, Pa.

Kruger said his group estimates that workplace software piracy in the U.S. alone last year cost software vendors about $3.2 billion in lost revenue. The estimate doesn't include software piracy in home or home-office environments, he said.

The 20 companies had been reported to BSA's toll-free software piracy hotline at 888-NO-PIRACY and were investigated by the group. Some of the reports about software piracy came to the BSA from disgruntled former employees, while others came from employees who are offended that their businesses are using software without paying for it, Kruger said.

"It isn't all that hard to find yourself the target of a BSA investigation," he said. "You're only one call away."

A BSA spokesman said that while the organization offers rewards to hotline tipsters in some countries, that isn't the case in the U.S.

Kruger said the BSA computes software piracy by conducting marketing surveys to compare the number of PCs and software applications within businesses to the number of PCs and software applications sold. If the number of applications on computers in a workplace is greater than the number of applications sold there, then the group attributes the difference to piracy.

New IBM Unit to Focus on Data Integration

Will help companies tightly link applications

BY JAIKUMAR VIJAYAN

A new IBM business unit will offer services to manufacturers that should help improve operational efficiencies and quality by letting them gather better information about the products they make, company officials said.

The IBM Product Lifecyle Management (PLM) unit will partner with Dassault Systemes SA in Suresnes, France, i2 Technologies Inc. in Dallas and San Mateo, Calif.-based Siebel Systems Inc. PLM will help companies tightly link applications for functions such as manufacturing, procurement and customer relationship management.

IBM's efforts are similar to those of vendors such as SAP AG and Waltham, Mass.-based Parametric Technology Corp., which are extending product data management capabilities to the Web, said Ed Miller, president of CIMdata Corp., a consultancy in Ann Arbor, Mich.

"Some of these companies are both rivals and collaborators," said Miller.

A core part of PLM will be Dassault's Web-based Enovia Portfolio 2. IBM will use the technology to enable manufacturers to deploy Internet portals that allow the propagation and sharing of product data and development information among internal departments, external suppliers and customers.

Such integration will let manufacturers track and update products from concept and design through manufacturing and use by the customer, said Steve Hassell, CIO at Newport News Shipbuilding Inc. (NNS), a $1.9 billion maker of aircraft carriers and nuclear submarines in Newport News, Va.

NNS is already using IBM's products and services in building a shared data environment that combines manufacturing and parts catalog data with financial, procurement and business information systems.

Previously, it was possible to manually pull information together from disparate systems, such as inventory, product availability and parts performance, "but you never got a snapshot of the whole," Hassell said.

An integrated view of product data allows for "improved productivity, efficiency, quality, internal resource control and overall customer satisfaction," said Allen Lee, president of Acma Computer Co., a Fremont, Calif.-based manufacturer of PCs.

The company has already linked its sales order management and Pleasanton, Calif.-based PeopleSoft Inc.'s enterprise resource planning software. Tying into that is Web-based supply-chain software from San Jose-based Datasweep Inc.

But pulling off integration on such a large scale poses business process challenges, warned Hassell. The most difficult of those is the "cultural aspect" of getting different units to rethink business processes and work together in a shared environment, he said.

Linking Apps:

- Provide a set of Windows NT and Web-based products for sharing 3-D product data.
- Allow product development information to be shared across an enterprise.
- Provide product development staff with access to other enterprise information systems, including computer-aided design and Web-based data

Oracle Backtracks on Vow Against ASPs

One service provider says it and other companies are signing hosting agreements

BY JENNIFER DISABATINO

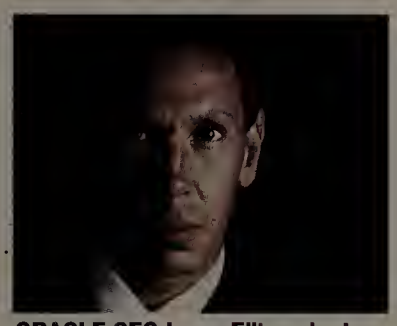
ORACLE CORP. is starting to warm up to application service providers (ASP), seven months after CEO Larry Ellison said he would allow third parties to host the company's business applications "over my dead body."

In keeping with Ellison's vow, Oracle has been trying to route users to its own application hosting unit, Oracle Business OnLine. But software analysts said they were briefed last month by Oracle on a plan to begin letting independent ASPs host the company's enterprise resource planning (ERP) and customer relationship management applications for corporate users.

Eric Murphy, an executive vice president at Agilera.com Inc. in Englewood, Colo., said his company and other ASPs have started signing hosting agreements with Oracle under a new certification program that hasn't yet been officially announced.

"It's a good thing Larry Ellison has nine lives," joked Amy Mizoras, an analyst at International Data Corp. (IDC) in Framingham, Mass. "Never say never" is the lesson, Mizoras added. "As soon as [Ellison] made that statement, people were waiting for it to become untrue," she said.

Ellison's willingness to change his adamant stance on application hosting is a sign that Oracle is concerned about losing potential customers to SAP AG and other ERP vendors that already work cooperatively with ASPs, said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Berkeley, Calif.



ORACLE CEO Larry Ellison had said he would allow ASPs to host Oracle apps "over my dead body"

Business OnLine just isn't big enough to meet all the demand for hosting services from users who are potential buyers of Oracle's applications, Greenbaum said. "Business OnLine has not had a healthy beginning," he added. "Oracle had to do this or risk walking around with egg on its face for a long time."

Oracle officials declined to confirm or deny the company's reported dealings with other ASPs and chose not to respond to Greenbaum's comments.

Ellison had said Oracle wanted to do all of its own application hosting so it could avoid being blamed by users if they had problems with an ASP that the software vendor couldn't control. That's in keeping with an approach espoused by Ellison last year after Oracle ran into big difficulties while trying to integrate applications from multiple vendors into a bundle for consumer packaged goods companies.

But Clare Gillan, another IDC analyst, said working with other ASPs "makes a tremendous amount of sense" as a way for Oracle to reach more customers.

"When Oracle said they would never do this, the [ASP] market was still ill-defined," Gillan said. "This is a huge decision. It undoubtedly came from the top of the company." ◗

Hitachi Bolts Into Enterprise Storage Field

Plans to unleash Lightning on EMC

BY KATHLEEN OHLSON

If Hitachi Data Systems Inc. has its way, Lightning will strike enterprise storage rival EMC Corp.

Santa Clara, Calif.-based HDS last week unveiled Freedom Storage 9900, code-named Lightning, a high-end storage array that scales up to 37 terabytes.

The 9900 features an internal switched bus architecture that supplies bandwidth of up to 6.4GB/sec. As many as 64 concurrent, large-scale data transfers can occur, and as the data load increases, the system processes the information faster, said Steve Duplessie, an analyst at Enterprise Storage Group Inc. in Milford, Mass.

In comparison, EMC's Symmetrix 8000, an upgrade launched in April, offers bandwidth of up to 1.4GB/sec., according to analysts.

Duplessie and other analysts gave Hitachi's 9900 high marks for its hardware.

"For customers, this will be eye-catching," said William Hurley, an analyst at The Yankee Group in Boston. HDS made "significant steps forward in terms of capacity and performance," as well as offering full Fibre Channel data transfer capability, he said.

Although they praised the 9900, analysts said HDS will have to bolster its sales and marketing efforts to compete effectively against EMC.

"[HDS] has one of the best [storage] lines, but [is] weak in marketing," said Chuck Standefer, an analyst at Evaluator Group Inc. in Englewood, Colo. "If it strengthens its efforts, [HDS] could severely impact EMC," forcing EMC to roll out new technology, Standefer said.

Marlene Woodworth, HDS' vice president of product management and marketing for enterprise products, defended the company's marketing efforts, noting that it is promoting the 9900 over the Web and in other media as part of a major ad campaign.

According to HDS, approximately five of the 9900 systems that have been produced so far have been sold to selected customers. The company expects volume shipments to begin in early September.

Predictably, EMC said it doesn't see the 9900 as a threat.

HDS "is in a hurry-up offense, and they rushed the product into market before it was ready, which is consistent with their history," said Dave Farmer, an EMC spokesman in Hopkinton, Mass.

The 9900's software features are similar to those in Symmetrix, analysts said. But Farmer disputed that, claiming the 9900 "is severely lacking in new software functionality," which he said has been an "Achilles' heel for Hitachi."

HDS insists it's prepared to go head-to-head with EMC.

"We're ready to go, we're the first to the market with this thing, and it's time we show what we can do," said Don McNicoll, director of product marketing at HDS.

Pricing for the 9900 ranges from $600,000 to $12 million, depending on configuration. ◗

HDS Freedom Storage 9000

- Code-named Lightning, it's a high-end storage array
- Volume shipments will begin in early September. Price runs from $600,000 to $12 million
- Up to 37 terabytes of data can be stored
- Internal path structure consists of Fibre switching
- Internal bandwidth totals up to 6.4GB/sec.

BRIEFS

Dell Sets Up Wireless Unit

Dell Computer Corp. last week became the latest major computer vendor to announce the establishment of a wireless business unit, aimed at tapping into the emerging global market for wireless network access. The Dell unit will be headed by 46-year-old Moe Grzelakowski, a former executive at Schaumburg, Ill.-based Motorola Inc. He will join Dell as a senior vice president, the Round Rock, Texas-based direct PC vendor said.

Lucent Names Network Spin-Off

Officials at Lucent Technologies Inc. last week said the company is proceeding with the spin-off of its enterprise networking group that was announced in March. The new company will be called Avaya Inc., according to Murray Hill, N.J.-based Lucent.

Henry B. Schacht, 65, former chairman and CEO of Lucent Technologies and former CEO of Columbus, Ind.-based Cummins Engine Co., will become chairman of the company. Donald K. Peterson, 50, former executive vice president and chief financial officer at Lucent, will become president and CEO. The spin-off will be completed by Sept. 30, Lucent officials said.

Citrix Under New Management

Edward Iacobucci, founder and chairman of Citrix Systems Inc., has left the Fort Lauderdale, Fla.-based company following lower-than-expected second-quarter profits and a sharp drop in the company's stock price. Roger Roberts, the company's CEO from 1990 to 1998, has replaced Iacobucci. The application server software vendor has started a search for a CEO to replace Mark Templeton, who will stay on as president.

Analysts said they blamed Citrix's problems on its leadership rather than on its flagship WinFrame and MetaFrame products. "They were too aggressive on their [Asian sales] estimates, and they bought into their own hype," said analyst Peter Urban, at AMR Research Inc. in Boston.

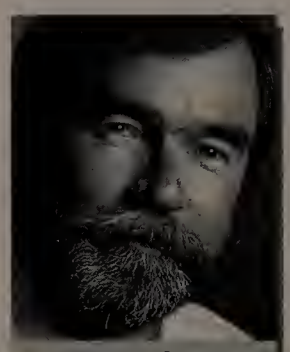
MARK HALL

The map of ourselves

LAST WEEK, the world celebrated the complete mapping of the previously uncharted territory of the human genome. It was an amazing accomplishment, one not possible without computers — and similar to the exploration of space, as described in this week's cover story on the SETI project.

Of course, more than computing horsepower went into the cartography of what scientists are calling "the first draft" of our genetic code.

Human creativity, patience and skill were at the center of it. To those qualities, we give our first acknowledgments and congratulations. But without the computer as the primary tool used to assemble, analyze and annotate what we now know about our genetic realm, we would be like Leif Eriksson's crew on the shores of Newfoundland — explorers hundreds of years from greatness.



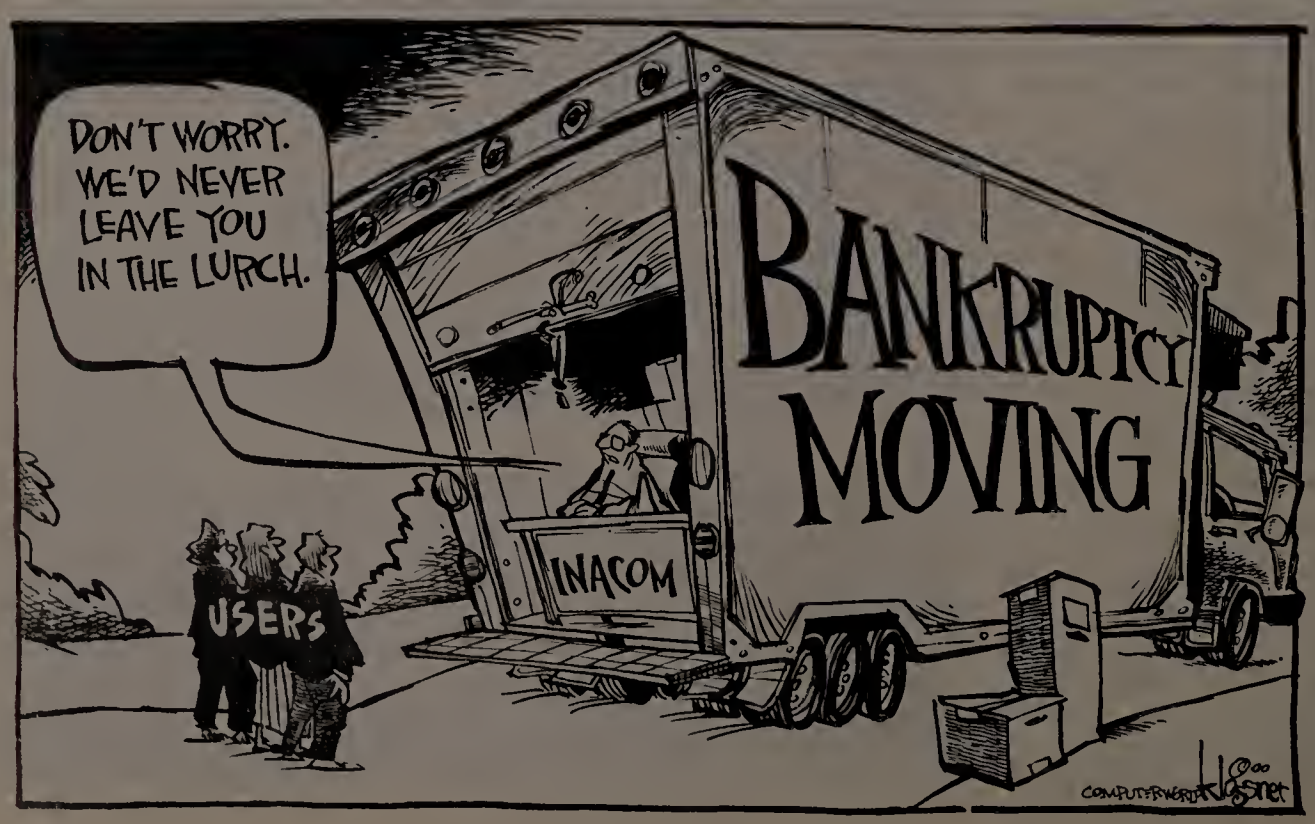
MARK HALL is *Computerworld*'s West Coast editor. You can contact him at mark_hall@computerworld.com.

Instead, computers have made us like seafarers armed with a compass, a sextant, a sharp-eyed lookout and a state-of-the-art GPS system. We may have a long way to travel with projects like SETI, but with the human genome, we know exactly where we're going and how to get there.

We just don't know what we'll find once we arrive. Will it be a world of cures for many forms of human suffering? Or will it be a place where we diminish individuals and ignore personal privacy? We have time to answer these questions while we continue to pursue the topographical details of our species. Despite our new knowledge and the vast computing power at our disposal, essentially we remain tourists in the genetic universe and must learn far more.

It's important for the U.S. to increase its computing investment in genome mapping. Not for nationalistic reasons, but because, frankly, nowhere else will the pros and cons about the underlying issues be as widely debated and discussed.

Because IT managers are so familiar with the same tools, they can best appreciate the magnitude and implications of the accomplishment of the scientists who conquered the human genome — ahead of schedule and under budget, to boot. You should tip your hats to those who have, for better or worse, achieved something akin to what the first great mapmaker, Ptolemy, did by defining our cosmos. It took 1,400 years before other scientists with better tools got closer to the truth. Let's hope we can reach the ultimate truth much faster than that. ◗



READERS' LETTERS

H-1Bs not necessarily needed for new firms

"TECH CEOS May Be Forced Home" [Page One, June 19] describes a 2-month-old Internet company, precisely the sort of company that can operate from anywhere in the world. It doesn't need to bring H-1B workers from India to the U.S.

One of the wonderful aspects of the Internet and the Information Age is the opportunity to reduce the logistics problems in moving work to where the workers are. Moving work from rich countries to poor countries reduces the gap between rich and poor, which increases the value of workers in both. The H-1B cap acts as a force to motivate companies to increase this trend, which, I think, is a good thing.

John W. Simpson
Raleigh, N.C.
jwsimpso@unity.ncsu.edu

H-1B VISA holders were lucky to have their six-year experience in the first place. Why don't they take it, their newly found opportunity and whatever capital they have acquired and start a company in their homeland? I'm sure that India or China would benefit.

Ralph E. Clark
McAllen, Texas

Don't blame us for lack of competition

MOST OF US don't want to build computers out of software parts. We don't want to be systems integrators. We don't want our productive, service-delivering, profit-generating employees using their time to be guinea pigs for our systems integration efforts. We just want a better computing experience.

I have four suggestions for Dan Drake ["We May Be Partly to Blame for the Microsoft Mess," News Opinion, June 5]:

- Begin by realizing that we have finite budgets and already buy the most cost-effective things that come closest to meeting our needs, including expert advisers who aren't cheap.
- Don't insult us by suggesting that we don't know what we want and don't know how to get it.
- Let us tell vendors with our wallets and purchase orders whose products we're choosing.
- Don't tell all your competitors how to take away your customers. Make them work for that knowledge. That's called competition, and like war, it encourages true innovation.

Paul Schmied
Technical consultant
Arlington Heights, Ill.

Include handicapped

IN READING YOUR 100 Best Places To Work report [Business, June 5], I failed to see a couple of very important questions that should have been asked of every prospective candidate before being considered for inclusion on the list: "How many handicapped people do you have on your staff?" and, "Are you actively recruiting well-qualified handicapped people?"

P. E. Gould
Gaithersburg, Md.

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

The privacy debate

FACEOFF

JASON CATLETT

Web demonstrates need for new laws

DO YOU THINK YOU should have the right to see the data that companies keep about you? If you answer yes, you're among the overwhelming majority of Americans, according to surveys.

But under current law, you don't have the right to access that data. In 1974, the Fair Credit Reporting Act gave you the right to see your credit report, but the companies selling these reports actually have a lot more marketing information about you — such as demographic, psychographic, transactional and inferred data — that is being sold without your consent to unknown parties for unknown purposes. You have no legal right to see this data, and if you ask for it, most companies will ignore you.

JASON CATLETT is president of Junkbusters Corp., a privacy advocacy firm in Green Brook, N.J.

Do you think you should have the legal right to require these companies to stop selling this information?

Some personal data vendors accept "opt-out" requests, but others refuse or ignore them, and in either case you have little legal recourse if they accidentally or deliberately continue to sell profiles about you. In most developed countries, people have a "private right of action" to sue the company for a nominal amount (typically $100 to $500) in such cases, giving these companies an incentive to comply.

Another question: Suppose when you buy something online, the company's form says, "Please tell us your phone number so we can call you in case there's a problem with your order" and the company later sells your number to telemarketers? Would you be happy? Or would you be happier if the law required the company to obtain your consent before using your personal information for a purpose other than the one for which it was collected?

These three questions are essentially asking whether you support laws requiring companies to abide by "fair information practices."

The key principles of fair information practices include the following:

- Obtaining consent, where appropriate, prior to collecting data.
- Allowing people to have access to the data collected about them.
- Complying with requests to delete the data.
- Specifying the purpose of the data and respecting that purpose.
- Keeping the data secure.

Most Americans support such privacy laws, but the laws we actually have are extremely limited and patchy when they concern companies.

Lobbyists for organizations such as the Direct Marketing Association have managed to stop Congress and state legislatures from responding to constituents' wishes for privacy and control over their information.

But the Internet has put these questions in front of people's faces with spam, online profiling by Web advertisers and the retailing of vast databases of personal information. A consensus has been reached in Washington that the American people need a lot more privacy rights than they have now.

Should that translate into new laws, it will mean a lot of work for IT professionals, just as environmental protection means a lot of work for chemical companies.

Data security has never been easy, and the incentives to get it right will increase when individuals whose data is accidentally spilled can sue for $500. For example, retrofitting large legacy systems to provide access to data will be a major project for big companies.

Of course, these laws won't kick in for years, but the time to start work is now. ◗

RONALD L. PLESSER

Leave policing up to private sector

LEGISLATION OR STRONGER federal regulations won't provide greater privacy protections on the Internet and could stifle the remarkable innovation occurring there. Rather, the best way to effectively protect consumer privacy on the Net is to encourage the many industry-developed efforts that are now taking place to provide strong privacy notices on e-commerce sites and choice with respect to transfers to of information to third parties.

Consumers are engaging in e-commerce at an unprecedented pace. Likewise, the growth in e-commerce is in large part responsible for our current economic prosperity. Every day, we're seeing the birth of new and innovative business models that will help us manage information in the Information Age. New laws or broader regulations could even limit exciting new personalization technologies, some of which were designed to allow individuals to control what information they give to others [Special Report, June 19].

Consumer knowledge and empowerment are the keys to a successful privacy policy. And for privacy protection to work, we need to give consumers the opportunity to look at a Web site, check whether it has an easily understandable privacy policy and be certain that any description of the site's practices is accurate. Consumers can then make an informed decision about whether to proceed at that site or go to another. Companies know that they must win consumers' trust, or their businesses won't reach their potential levels of success.

RONALD L. PLESSER is a partner at the Washington law firm Piper Marbury Rudnick & Wolfe LLP and specializes in IT matters. Contact him at **ron.plesser@piperrudnick.com.**

Likewise, a greater level of consumer choices, including consent or "opt-in" options, should be provided for certain types of sensitive information. For example, Web sites that provide access to medical advice or detailed financial information should offer consumers stronger choices regarding data privacy than Web sites that sell less-sensitive products and services.

Industry isn't always opposed to privacy legislation, as some suggest. Consider the case of children's privacy on the Internet. Industry, Congress, the Federal Trade Commission (FTC) and privacy advocates worked together in passing the Children's Online Privacy Protection Act of 1998.

When evaluating the potential for regulation in the broader area of Internet privacy, it's important to give appropriate recognition to industry's continued and significant progress and commitment of resources to develop and implement effective protection. A recent FTC report states that all 100 of the most popular Web sites post privacy notices. Moreover, 88% of all sites post privacy notices, up from 66% in 1999 and 14% in 1998.

Consider companies' rapid adoption of The Direct Marketing Association's Privacy Promise and the seal and enforcement programs of the Better Business Bureau Online and Truste. More than 2,500 companies have signed on to the Privacy Promise and will empower consumers with notices and choice concerning the transfer of their personal information to third parties. Likewise, BBB Online and Truste have quickly signed up several thousand participants.

Businesses, Congress, the FTC and the U.S. Department of Commerce will continue to work together and discuss these important issues. Given the continuing development, innovation and significant progress by business, coupled with the fact that no substantial evidence of harm to individuals has been identified, the appropriate course of action isn't delegating privacy protection to a regulatory agency. Instead, we should operate within a framework that furthers market choices on consumers' privacy preferences. That will result in an Internet privacy program that will protect consumers and promote the continuing growth of e-commerce. ◗

JOHN GANTZ

To keep your best IT people, keep them learning

WHENEVER I TALK ABOUT the shortage of information technology professionals, the most common question I get in response — besides "Where do I find good people?" — is "How do I keep good people?"

This is more than a rhetorical question. With the war for talent heating up and top-notch IT vendors raising the bar on retention programs, attrition will become a serious problem for average IT shops unless they work proactively to prevent it. As it is, 60% of the 600,000 to 700,000 job openings this year in the U.S. for IT professionals will be the result of employees changing jobs. This game of musical chairs costs money.

JOHN GANTZ is a senior vice president at International Data Corp. in Framingham, Mass. Contact him at jgantz@idc.com.

Typical IT turnover is between 15% and 25%, but good companies can get their numbers down below 15%. However, it's not easy, and it won't happen by accident.

Believe it or not, money isn't the most important element in retaining good employees. Oh, salaries can't be too out of whack, but employee satisfaction depends on a number of factors, including career development, recognition in the job at hand and the social atmosphere or lifestyle benefits that come with the job.

In fact, the companies with leading-edge retention programs address all these areas. According to International Data Corp.'s guru on resourcing strategies, Michael Boyd, program elements can include the following:

- Ongoing education and training.
- A mix of job assignments.
- The organization of small groups and teams.
- Peer group and mentoring programs.
- Organized career counseling.
- Flextime and other lifestyle benefits, including on-site day care, fitness clubs and sponsored charity work.
- Internal marketing and communication with employees.

My advice to the average IT shop: Pay attention to the big professional services firms, since their success in retaining employees goes right to the bottom line. All have major employee-retention programs in place.

Ernst & Young, for instance, was able to cut turnover from 24% to 16% in one year by focusing on several key areas. These included flexible work arrangements, concierge and family services, companywide orientation programs and employee surveys.

But perhaps the most attention was paid to establishing systems that support employee career development. Each employee has a performance counselor, participates in peer and affinity groups and develops a learning map that's updated via the Web and tailored to the competencies required for the employee's career track. The company's performance measurement system has been revamped to measure an employee's contributions to clients, the company and himself.

With baby boomers heading for retirement and post-baby boomers swelling the workforce, I believe that what it takes to retain good employees will change. My bet is that the most important single tool for retaining employees, even more so than lifestyle benefits, will be training — the kind that comes from structured courses and from a variety of challenging jobs. Young employees have all heard how often they're likely to change careers in the next 40 years, and they understand that without continual learning, their skills will atrophy.

OK, but how can you keep freshly trained employees from jumping ship once they're fully trained? Simple: Just keep the education coming. It will become addictive. With luck, good employees will spend 40 years in your company while they prepare for their next jobs. ◗

MICHAEL GARTENBERG

Why a breakup of Microsoft is a bad idea

THE VERY NAME *Microsoft* evokes an emotional response from people. The conventional wisdom is "Love them, hate them, admire them or stand in awe of them — in today's world of technology you can do anything but ignore them."

MICHAEL GARTENBERG, former lead Microsoft analyst at Gartner Group Inc., is a partner at Dellet LLC, a venture capital firm in Englewood, N.J., focusing on the Israeli market. Contact him at michaelg@dellet.com.

The truth is, Microsoft is neither good nor evil. It's a company neither to be feared nor held in awe. Microsoft is a business, no more and no less. The government's recent effort to portray it as something else has done a disservice to the industry and the public and has led to a verdict that serves no one, except Microsoft's competition. After you get past the emotional side of the case against Microsoft, you discover why a breakup is a bad idea.

First, a court-ordered breakup wouldn't be simple. As much as the government likes to believe that there are natural fracture lines between applications and operating systems, the reality is that Microsoft is far more complex than that. It is — for all intents and purposes — an applied research company. It creates "technology streams" such as the Windows NT microkernel, the Windows 95 user interface and the Active Directory server. It then packages these technologies, licenses them and sells them. Some of these technologies are deployed into applications architectures, some into more traditional operating systems. What learned government panel will decide whether Active Directory is an operating systems technology or an applications architecture?

Second, the notion that a breakup will somehow level the playing field for Microsoft Office's competitors is false. The most oft-cited example is that the new applications company would create an Office suite for Linux. Microsoft creates applications where a market for them exists. It has long supported Apple's Macintosh operating system with Office applications and other software. If there were a potential profit in creating an Office suite for Linux, it would do so, as it has for the Mac OS. But the business proposition isn't there, nor will it be if the company is broken up. Linux remains unpopular for desktop users for many reasons, though lack of Microsoft Office isn't chief among them.

Third, the government believes that breaking up Microsoft will lower costs for IT users. Not only is this unlikely, but the more likely scenario is higher costs. Breaking up Microsoft along the court's current guidelines will result in core technologies being split arbitrarily, potentially raising total cost of ownership and creating barriers to complex technologies working well together. IT departments complain that different products don't work well enough together, and a breakup would make that worse. All users will pay the added price of supporting the profit structures of two companies instead of one.

The only beneficiary of the court verdict would be a Microsoft competitor that will be able to react much faster without the constraints imposed on a split company. For Microsoft, future success won't necessarily mean market dominance. The dominance that it has achieved in the operating system and office suite markets probably won't be repeated. Success without total dominance means there will always be strong players whose market positions will be large enough and stable enough to afford its adopters reasonably low risk and provide the competition the government seeks. But a divided Microsoft will be unable to compete effectively in the sea change that is the technology industry. Today, many of its strengths are also its weaknesses, and many of the markets it would like to serve are new to it and other companies. Today's rapid pace of technology, not the breakup of Microsoft, will serve to level the competitive playing field.

If Microsoft has engaged in inappropriate behavior, it should be forced to change its conduct. A breakup is a punishment that doesn't fit the crime and doesn't serve the public interest, Microsoft's customers or the industry at large. ◗

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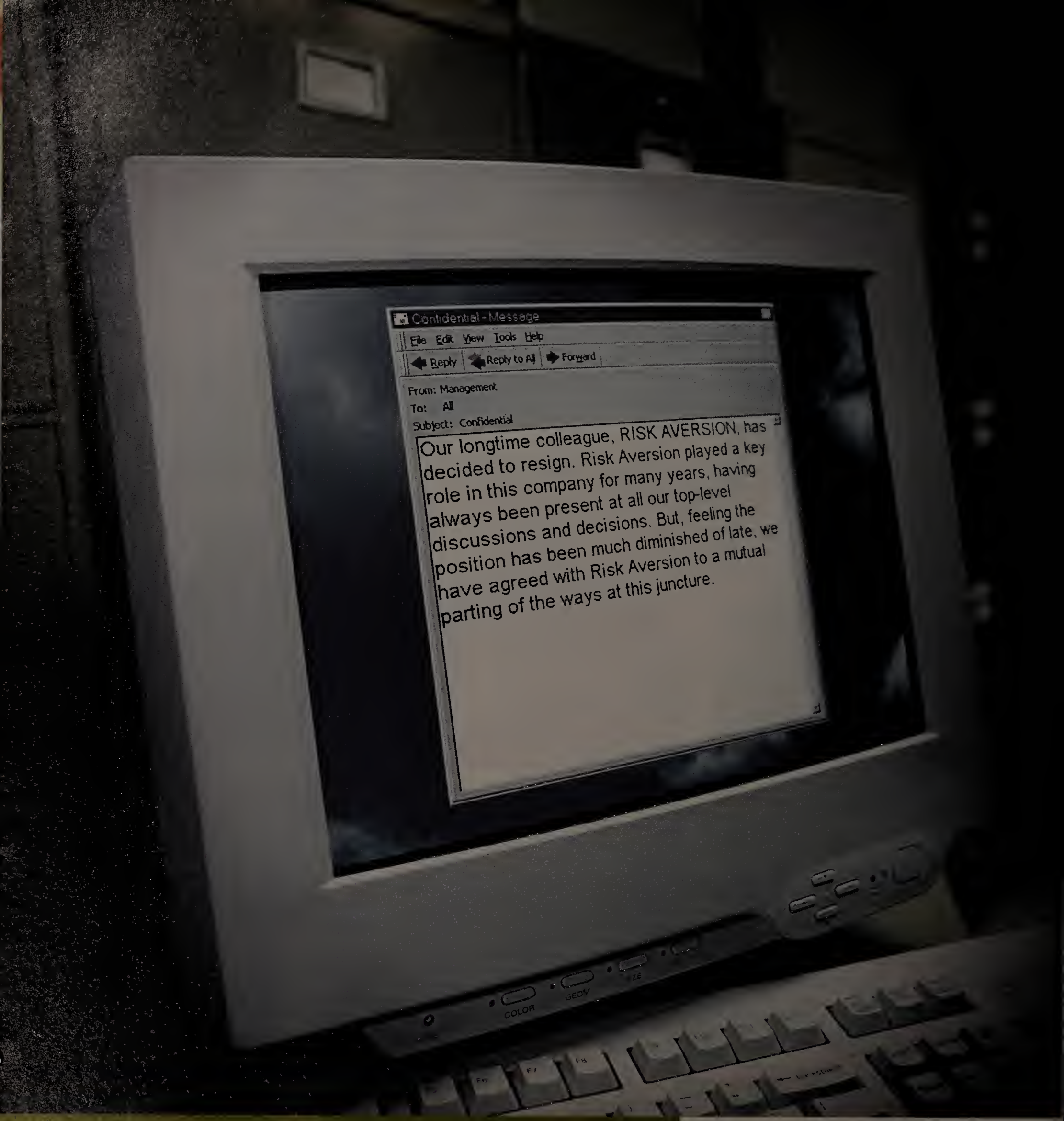

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BUSINESS

WIRELESS TRACKING

FedEx and UPS are keeping with tradition by staying ahead of the game. Both companies have extended their services by making wireless tracking of Web-based information available to customers. ▸ 32

WEB OF BUGS

Volkswagen recently launched a pilot program aimed at selling 4,000 special-edition Bugs online. The carmaker says it hopes the program will bring it closer to customers and still tie the dealer into the process. ▸ 33

IT VISIONARY

The fast pace of technological change is causing many companies to rethink their operations. At J. P. Morgan, Veronique Weill is doing that type of thinking. And her conclusion is that J. P. Morgan should be managing assets — not technology — so it is outsourcing to The Bank of New York. ▸ 33

ALL ABOARD

What's it like to work at Amtrak? With trains chugging by and whistles blowing all the live-long day, IT workers get a strong sense of America's locomotive heritage while still getting the chance to implement modern-day technology. ▸ 34

PHONE HOME

When SETI@home was launched in May last year, it was faced with the monstrous mission implied in its very name — the search for extraterrestrial intelligence. But it's been pushing forward in its effort to identify deep-space signals by linking thousands of PCs into a virtual, massively parallel computer. ▸ 36

QUICKSTUDY

The Web has introduced new opportunities for businesses to work together. But for companies to successfully take part in online business-to-business exchanges, they need to learn how to function in a collaborative environment. ▸ 45

EXEC ED 101

If you're looking for ways to help your IT stars move up through the ranks, executive education programs are key. But with so many options, it's important to choose the right ones. In a new monthly feature, *Computerworld* examines some of the programs available and what they have to offer. ▸ 40

HOW TO AVOID KM MISTAKES

Learning what customers want and how to get it to them is critical for businesses. But researchers say 50% of knowledge management (KM) projects fail. Find out five common KM mistakes and how to avoid them. ▸ 44

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JACK KENNER

EILEEN CASSINI, vice president of IT services at Harrah's Entertainment, says she doesn't think that the hiring situation is getting worse; it's just a continuation of the conditions of the past two years

PERSISTENCE PAYS OFF

IT WORKERS HAVE IT MADE. These days, it's the employees who are calling the shots, while companies are bending over backward to lure talented staff. In our recent hiring survey, *Computerworld* got the lowdown from IT managers, recruiters and job seekers about what it takes to survive in today's labor market.

42

FedEx, UPS Vie to Offer Wireless Tracking Services

Carriers race to provide online information from any device, anywhere in the world

BY BOB BREWIN

UNITED PARCEL Service of America Inc. and Federal Express Corp. have extended their competition to the wireless arena, as they vie to provide wireless access to Web-based tracking information from any device, anywhere in the world.

Analysts said the rush to offer wireless access to information is part of the companies' efforts to encourage customers to obtain tracking information through Web sites rather than phone inquiries.

The goal is to provide easy, shipper-controlled access to real-time information and to save money in the process.

Two weeks ago, Atlanta-based UPS said it will provide domestic customers with the ability to track shipments via any wireless device, including pagers and cell phones, starting this September. It plans to extend the service worldwide by the first quarter of next year.

Air2Web Inc., a wireless application service provider in Atlanta, will supply UPS with the enabling software. A spokeswoman for Air2Web said the software will allow customers to track shipments as well as determine time in transit.

The new service will also allow wireless customers to calculate the cost of shipments and determine the location of the nearest UPS drop box.

In January, UPS began offering limited wireless tracking, available only to users of Palm VII personal digital assistants.

In October, Memphis-based FedEx launched a similar wireless tracking service for its customers worldwide who use Palm Inc. PDAs and devices powered by Microsoft Corp.'s Windows CE operating system. FedEx extended wireless tracking capability to users of Web-enabled phones manufactured by Schaumburg, Ill.-based Motorola Inc. in April.

A UPS spokeswoman said extending wireless tracking capability to multiple devices was "much more complex" and took more time than developing the interface for the Palm VIIs.

"We had to deal with multiple devices, different screen sizes and different protocols," she said.

AvantGo Inc., a wireless application service provider in San Mateo, Calif., provides FedEx with its wireless tracking software, downloadable from FedEx's Web site.

Laurie Tucker, senior vice president for global product marketing at FedEx, said use of the wireless tracking software, available to the company's customers worldwide has steadily increased. She said there were 50,000 downloads in the first quarter after introduction. "I would not be surprised if we had exceeded 100,000 downloads through March of this year," Tucker said.

A FedEx spokeswoman said AvantGo is working to support wireless access by cell phones from other manufacturers and pagers, but she was unable to specify an availability date.

Alan Reiter, an analyst at Wireless Internet & Mobile Computing in Chevy Chase, Md., called the carriers' move to wireless "a logical extension of obvious benefits" the companies and their customers derive from wired Web access.

While wireless Web-service is still in its infancy, Tom Scannell, a Quincy, Mass.-based analyst at Mobile Insights, said the carriers are laying the groundwork for the future. "They are looking down the road to the day when everyone will be pervasively connected," Scannell said.

Air War

The wireless package-tracking derby

January 1999
UPS offers wireless tracking to Palm VIII users.

October 1999
FedEx provides wireless tracking for Palm VIII users.

April 2000
FedEx extends wireless service to users with Motorola Web-enabled cell phones worldwide.

June 2000
UPS says it will extend wireless tracking to domestic users of any device in September, with a worldwide rollout planned for the first quarter of 2001.

Amadeus Teams Up With Lotus

Travel service plays to B-to-B market

BY MICHAEL MEEHAN

Trying to get into the business-to-business travel market before it's too late, Amadeus Global Travel Distribution SA recently said it's teaming up with IBM's Lotus Development Corp. subsidiary to design corporate travel-management applications that will run on intranets or the public Internet.

Rather than going through the 50,000 terminals that Amadeus boasts in travel agencies and airline offices, the system would let corporate travel managers or end users book flights and hotels directly, while enforcing corporate restrictions on travel. The Lotus connection would add access through Domino.

Madrid-based Amadeus — which operates one of the big computerized travel-reservation systems — has yet to make a big splash in the business-to-business portion of the travel industry. That's becoming a battleground among the established reservations systems and several Internet upstarts. Companies such as Sabre Inc., GetThere.com Inc., Worldspan LP and eTravel Ltd. already have staked out positions ahead of Amadeus.

But it's still at least six months away from being ready to release its new applications, said David Jones, interim president and CEO of Amadeus America in Miami.

Henry Harteveldt, an analyst at Forrester Research Inc. in Cambridge, Mass., called Amadeus' plans "a day late and a dollar short." Forrester estimates that 400 of the Fortune 500 companies already have established a business-to-business travel link with one of Amadeus' rivals.

But Lorraine Sileo, an analyst at online travel-research firm PhoCusWright Inc. in Sherman, Conn., said Amadeus and other established reservation-systems operators are redefining themselves and still may build on their strong presence in Europe and South America.

Harrah's Entertainment Bets Big on Its New IT Structure

Banking on separate support, development

BY JAMES COPE

In an effort to balance the need for fast application development and high-quality, focused end-user support, casino operator Harrah's Entertainment Inc. will implement a new IT organizational structure this week. It's based on a consulting firm model in which workers are dedicated to specific projects or support roles for defined periods of time, rather than mixing their roles.

JOHN BOUSHY: Harrah's development split into two groups

In the prior structure, information technology staff worked on development projects and were intermittently pulled off to do routine support and maintenance, said John Boushy, senior vice president of brand operations and IT at Harrah's. That was disconcerting to staff and often delayed project completion.

Developers generally love to work with users, according to David Foote, founding partner of Foote Partners, LLC in New Canaan, Conn. "But you can't afford to mess with their concentration, because they're very highly paid," he said.

Now, IT is split into two groups, development and support, Boushy explained. "The support people handle application support, run the computers, run the network, deliver value," Boushy said. The development crew does infrastructure and application development. Development builds new value for the business, he added.

Many of the final processes and procedures won't be in place until later this year, but "everyone in IT is functioning in the new structure now," said Eileen Cassini, vice president of IT services at the Las Vegas firm.

Whether assigned to support or development, "people now know what they'll be doing when they go to work in the morning," Boushy noted. Moreover, workers can finish a project and then move on to a new assignment, or even change roles between development and support.

Boushy said the two-part

J. P. Morgan IT Exec Loosens Grip on Services

Will turn over firm's back-office operations to Bank of New York

Last year, J. P. Morgan & Co. took a major step in a new direction.

It signed a service agreement that let The Bank of New York Co. take over much of J. P. Morgan Investment Management Inc.'s European accounting systems.

J. P. Morgan officials say it was the first major asset manager to move many of its nonproprietary operational services to an outside provider — more than a year before other major firms.

Last week, the woman responsible — **Veronique Weill**, the former head of technology and operations for J. P. Morgan's asset management services in Europe — started her new job heading these services worldwide.

The first order of business is to turn over the rest of J. P. Morgan's back-office processes to The Bank of New York, she said.

Weill, 40, has been working for New York-based J. P. Morgan since 1985.

Computerworld reporter Maria Trombly caught up with her last week in New York.

Q: Why did you decide to outsource?

A: The technological challenge. We decided not to invest in the infrastructure but to go with The Bank of New York. They are doing the investment in the technology. We are going to focus on added value: the investment management process, front offices, sales, marketing, reporting — everything the client wants. That would really be our focus now.

VERONIQUE WEILL of J. P. Morgan says she wants to get the most talented people

Q: What exactly will The Bank of New York do for you?

A: We have a U.S. center, a European center and an Asian center, and what we want to do is not have operations processing people in New York and London anymore, just people looking after the trades.

This deal is about core accounting capabilities. That requires a lot of processing, a lot of investment in technology and a lot of people. It's not a business that you start from scratch. The Bank of New York has $3 trillion in assets. They're going to offer this service to other clients, too, so we're going to benefit from that.

Q: Will you have to eliminate any information technology jobs?

A: Around 200 in Europe and the U.S. The deal with The Bank of New York is that people are offered a job at The Bank of New York in Europe. In the U.S., if not everyone is offered a job at The Bank of New York, they are being redeployed in Morgan.

Q: What about outsourcing your accounting systems in Asia?

A: We're looking at it. We have in Asia some pretty strong regulatory trends, so we're going to be careful. I think we should have a position by the end of the year.

Q: What are you most worried about?

A: The war for talent — ... making sure we attract the best people, to retain the best people. What I'm also looking for in my business is to provide the right challenge for the people, making sure they're working on the right project, that they're stretched, that they're moving around and learning new things.

Q: How's the new job?

A: I think the job is absolutely terrific; the challenge is great. ◗

structure also makes sense for his IT managers. "On the support side, you're constantly looking for ways to provide the same service at less cost," Boushy said. "On the development side, though, the management model is about how you put together a team that has the talent for a project and how to maintain the focus."

When Harrah's initiated the program in February, Boushy said, workers asked: "Am I going to be pigeonholed? What does support mean? What does new development mean? How will management work?"

"We answered the questions and reviewed roles and responsibilities of each person," Boushy said. "We were amazed at how many people wanted to work on the support side."

"Some of the people who chose to move from development to the support did it to gain management responsibility, whereas some of the nonmanagement people from development simply wanted to interact with users," said Monica Tyson, manager for enterprise data warehouse projects at Harrah's.

"Prior to the new structure, I had responsibility for both development and support," Tyson said. "The issue we had was that production [support and maintenance] always had priority. Now I have more time to plan."

IT workers now enjoy a new level of predictability according to role and project, Cassini said. But they can rotate across projects and change roles.

Foote said, "People need to rotate. If you don't have a program to rotate assignments, people tend to leave. There's a lot of boredom out there."

"Sometimes our people joke about which side they're working for at the moment," Cassini said. Those who are working in support sometimes say they're at the heart of the organization, while people on the development side frequently claim to be the brains." ◗

Volkswagen Works Out Marketing Bugs on the Web

Teams with dealers to sell Beetles online

BY LEE COPELAND

Volkswagen of America Inc. is in the midst of a pilot program to sell limited-edition vehicles exclusively over the Web.

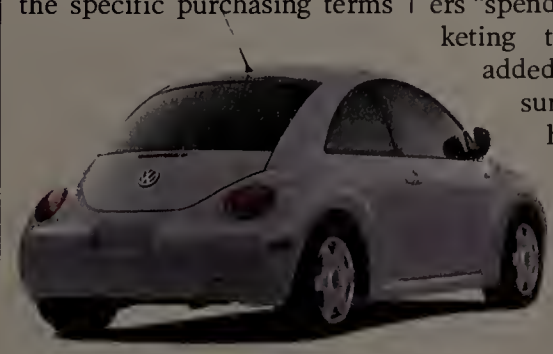
The pilot program, described by one analyst as an industry first, began in early May and will run until Volkswagen sells all 4,000 of its special-edition Vapor (blue) and Reflex (yellow) Beetles over the Web. So far, the Auburn Hills, Mich., automaker has sold 2,600 of the specialty vehicles, said Tesa Aragones, Internet manager at Volkswagen.

Volkswagen launched the project Web site, developed by SeraNova Inc. in Edison, N.J., so it can work with dealers to improve ties to customers, said Aragones. It also hopes to test whether this selling model could accomplish that goal, she added.

"It's important for us to build relationships with people that come to our site and provide content that is relevant to them," she said. "Instead of trying to go around the dealers, we have really integrated them into the process."

The process works like this: From the Web site, a customer interested in buying a vehicle picks a local dealer from whom he will eventually buy his new Beetle. He is then prompted through a configuration process to select the vehicle color, interior and transmission type. In the last step, the customer learns the suggested retail price, which ranges from $18,875 to $21,025, depending on options.

Customers must work out the specific purchasing terms and the final price with their dealers, but they have the option of negotiating with the dealer in person, over the phone or through an Internet messaging board.



VOLKSWAGEN Beetles like this one in Vapor are available – but only on the Internet

More than 50% of dealers used the message board to finalize car purchases, Aragones said, while 19% didn't use it at all. Of Volkswagen's 600 dealers, 535 participated in the program, she said.

Rob Leathern, an analyst at Jupiter Communications Inc. in New York, said that although local laws prevent automakers from selling cars directly to consumers over the Web, Web sites such as Volkswagen's provide a unique opportunity for car manufacturers to interact directly with consumers.

"It's in the manufacturers' interest to more directly establish a relationship with the customer," said Leathern. Carmakers "spend a lot of money marketing to consumers," he added, "and they're not sure if they are actually hitting the consumer or at what point in the buying cycle. This is one way to get feedback directly from the consumer and get ideas about future programs." ◗

WORKSTYLES

What It's Like to Work at . . . Amtrak

Interviewee: Nick Doggett, director of information technology, distributed systems group
Company: Amtrak (officially named National Railroad Passenger Corp.)
Main location: Washington
Tenure: Since 1997
Number of IT employees: Just shy of 400 in Washington; another 50 located at train stations, sales offices and a mainframe data center in Virginia
Number of employees: 25,000; most, but not all, are considered IT end users
Major IT systems: A reservation and ticketing system running on IBM mainframes using a transaction processing facility; a mainframe-based scheduling system; a Unix-based data warehouse for analyzing revenue and ridership data; a number of Windows NT-based applications; an Internet-based QuickTrack automated ticketing system installed at all 240 train stations nationwide; and an online ticket-reservation system. "We also provide a lot of the fiber that the Internet runs on."
New IT initiatives: "We're in the midst of a major project to improve the underlying technology of our Internet booking system; deploying the Fare Collection and On-Board Food and Beverage Sales systems; systems to support the Acela Express, the new high-speed rail in the Northeast Corridor [scheduled to open this summer]; and systems for a new mail and express-delivery business for large palletized packages."
What's unique about "working on the railroad all the live-long day?" "That's definitely part of the appeal of being in IT here. We have quite a few railroad buffs who work here. . . . And a lot of our offices are right by our train stations, so you'll be on a conference call and hear the trains chugging and the whistles blowing in the background."
Biggest misconception about working at Amtrak: "People think we're part of the federal government, but we're actually a private company."
Career development: "The IT positions here are well defined, and the career paths for each position are reviewed fairly regularly in concert with human resources to make sure the organization is competitive with comparable industries."
Bonus programs: "We all share in [incentive-based bonuses] for meeting annual revenue and ridership targets."
Dress code: Business casual every day from Memorial Day to Labor Day; business attire the rest of the year, with business-casual Fridays
Workday: "I put in half an hour on my laptop on the train on my way to the office. I usually get in before 8 a.m. and leave about 5:30 p.m."
Come on. Really? "We don't put in a lot of late nights except when we have a system cutover. During the early stages of the rollout of our new networks into the stations, there were a lot of late nights."
Number of telecommuters in IT: A few applications developers and some contracters.
On-site day care? No.
In-house cafeteria/food service: "There are plenty of great places to eat nearby."
The one thing everyone complains about: "Space has been an issue, but that may be temporary because we had staffed up [with contract IT workers] for our high-speed rail and marketing initiatives, and now that we're scaling back on the contract employees, that's freeing up space."
Where the office gossips: "We have a lovely rooftop area in our building."
Office mascot: "If we had one, we'd name him Spike, for railroad spikes – some people have those on their desk."
Little perks: Travel benefits, Employee Appreciation Days at the National Zoo and other venues and IT group get-togethers.
Would employees feel comfortable e-mailing the CEO, George Warrington? "Anyone who does have reservations about it shouldn't, because George is a no-nonsense businessman whose heart is with Amtrak and whose door is open to all employees."
Quote: "The stodgy old railroad isn't stodgy anymore."

– Leslie Goff (lgoff@ix.netcom.com)

PAUL A. STRASSMANN

Behind the claims

AFTER LAST MONTH'S RULING that ordered the breakup of Microsoft, Bill Gates made a number of public statements at a press conference that warrant closer examination of their credibility.

"Microsoft has brought widespread benefits to the economy . . . making the vision of low-cost computing a reality . . . [with] low prices that really arise out of the PC industry."

One of the best ways to judge this claim is to refer to Gartner Group's "TCO Manager for Distributed Computing" methodology. It was acquired from a corporation on whose board I served, so I understand its validity. The total cost of ownership (TCO) of a desktop computer at a typical firm runs about $10,000 per year. Hardware costs account for only 8%. Microsoft receives only a part of the total software costs (about 3.5%) of TCO. What, then, accounts for the remaining TCO of the estimated 95% of desktops that depend on Microsoft software?

By far, the largest share of these expenses appears as administrative and operating support costs, as well as the unproductive employee time that can be attributed to the difficulties of keeping Microsoft software running. So Gates' claim that Microsoft has delivered "low cost computing" has little merit.

"[The] judge's decision represents an unwarranted intrusion into the engine of economic growth for America."

Microsoft has consistently called itself a major source of current U.S. prosperity. It has bought newspaper ads stating: "The government is spending millions of taxpayer dollars in a court case that would stifle competition and interfere with an industry that is responsible for 25% of the nation's economic growth." But such claims are misleading and based on statistical distortions [Business, March 1, 1999]. Microsoft, as the fourth most profitable U.S. company, has been exceptionally adept at extracting profits for itself while leaving most of the desktop TCO to its customers to absorb as additional overhead.

Microsoft has been adept at extracting profits for itself.

To judge the impact of desktop computing costs, it's worth examining how corporate profits compare with TCO. My database includes financial data for 7,794 corporations that represent this country's key economic producers of profits. They reap $286.2 billion in pretax profits and employ nearly 21.7 million people. Using these two figures, I calculate pretax profit per employee to be $13,202 during 1998 and 1999 — years of unprecedented prosperity.

My database also tracks the spending patterns of corporations with a combined 3.6 million employees who use 1.5 million PCs — a sample that suggests that U.S. companies place computers on the desks of 42% of their employees. Thus, the TCO of PCs amounts to about one-third of total pretax profits.

What does this mean? The "engine of economic growth" is diminished by any excess costs of desktop computer ownership. Whether profits would be less without PCs is irrelevant. If everyone uses a PC, then the net competitive effect is not decisive.

Another way of looking at Microsoft's dubious claim of being a beacon of economic prosperity is to compare corporate taxes with the TCO of PCs. After all, tax revenues support the viability of the U.S. as a global economic power. Corporate tax payments for the 7,794 firms in my database average $5,607 per employee, or about 56% of the average TCO.

The Microsoft antitrust case has diverted attention from issues that really matter, such as Microsoft's threat to national security [Managing, Nov. 30, 1998] and its pursuit of maximizing profits at the expense of its customers' exorbitant TCO. Instead of speculating about the consequences of splitting Microsoft into two potential monopolies as a replacement for one real monopoly, paying greater attention to software security risks and to excessive ownership costs of personal computing would be of much greater benefit to everyone. ◗

Strassmann (paul@strassmann.com) has found that the number of PCs in a firm explains a large share of its IT budget. Legal remedies should demonstrate whether they reduce the costs and risks of desktop computing on a Microsoft platform.

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WHEN YOU'VE GOT A BIG JOB — like searching the universe for signs of intelligent life — you need all the help you can get. That was the idea behind the May 1999 launch of SETI@home, an imaginative application of distributed computing that could have far-reaching implications — for business.

SETI@home (*setiathome.ssl.berkeley.edu*), a project supported by the nonprofit SETI Institute in Mountain View, Calif., and other groups, has harnessed the Internet — and people's imaginations — to organize almost 2 million volunteer PCs into a virtual massively parallel computer.

The task: analyzing radio signals picked up by the Arecibo radio telescope in Puerto Rico — the one featured in the 1997 movie *Contact*. The goal: detecting the kind of deep-space radio signals that could indicate communication by other intelligence in the universe. The strategy: to use as many of the world's computers as possible together to accomplish the goal.

"The Internet lets us do that for first time in the history of computers," says David Anderson, the SETI team's distributed computing guru. "It lets us, in effect, make them into one big parallel supercomputer."

Moreover, the SETI@home software runs in the background or as a PC screen saver, so it doesn't interfere with users' normal computing tasks.

The search for extraterrestrial intelligence (SETI) may or may not find ET, but it has helped spur a change in thinking about the potential for distributed computing. Proponents say that linking computers through the Internet could enable long-term, computation-intensive tasks in aerodynamics, pharmacology, geophysics, biotechnology and manufacturing to be done in relatively little time.

Using the Internet as a massively parallel computer suddenly makes goals that were once tabled because they were deemed impractical possible, Anderson says. "There may be some analysis you want to do, and you see it will take 100,000 years of computer time, so you would throw away that idea," he explains. But in one year, SETI@home has used more computer time than that. "So those ideas can be taken out of [the] wastebasket and reconsidered," he says.

Potential users include energy companies that need to do seismic or geographic analyses before they start drilling for oil or digging for coal, manufacturers that do structural analysis or study fluid dynamics prior to transforming a design from a computer model into the real equipment, and engineering firms that stress-test everything from bridges to aircraft.

The basic idea is simple, says Dave McNett: "It's all based on not wasting the resource — running distributed software on your machine and letting it use whatever resources you aren't using."

McNett is president of Distributed.net, a Birmingham, Ala.-based nonprofit research foundation founded in 1997 to compete in an encryption-breaking contest. The group has grown to 20 developers and has rallied a 190,000-machine network (93% are PCs) to break code and solve mathematical puzzles for fun and prizes.

These kinds of networks can accomplish a great deal, McNett says, because 90% of most computers' processing power goes unused. "During the day, most PCs spend most of their time flying tiny toasters around," he says. Even when computers are in use, the majority of tasks aren't CPU-intensive. Working in a spreadsheet, for example, is CPU-intensive only when the columns are computed. "CPUs are used only in short bursts," McNett says. "And that's not even mentioning 6 p.m. to 9 a.m. and weekends and holidays."

Application Limits

Massively parallel computing "does make sense for use in the oil industry, and we have used the technique [internally] for some of our computationally intensive problems," says John M. Old, director of information management for worldwide exploration and production at Texaco Inc. in Houston.

But distributed computing isn't for every job. "The SETI project lends itself to breaking the data into small, independent chunks, which makes the parallel computing fairly simple," Old explains. Unfortunately, not all data can be segmented that way, and many projects require complex communication among processors.

McNett acknowledges that there are plenty of things an IBM RS/6000 can do that a distributed network can't. "We can't do anything that's more data-intensive than CPU-intensive," he explains. For example, weather prediction is difficult because the data is very interrelated. Distributed computing is better at jobs such as animation rendering, in which each of the 30 frames per second that go into a movie like *Toy Story* are separate tasks that can be distributed among thousands of computers.

With those kinds of jobs in mind, the folks at Distributed.net are considering a commercial spin-off. At present, Distributed.net's machines are equivalent to 42 144-node RS/6000s, the fastest computers on the market, at a net cost of about $120 million (based on the floating-point speed of the RS/6000 and the Pentium II/266 PC, the average computer on the distributed network). "We're proud of that," McNett says, "but the potential number of machines dwarfs what we have now."

If the SETI project rallied 2 million computers by word of mouth, imagine what a company that was willing to pay for your PC's time might accomplish. That's exactly what Jim Albea, chief operating officer at ProcessTree Network in Madison, Ala., was thinking in January when he set up a Web site soliciting computers for the April launch of what he claims is the first commercial venture in the field (*www.processtree.com*).

But despite the potential, there are

IT ON THE 'OU

An effort to identify deep-space signals by linl
parallel computer could have wide-ranging im

problems that have to be solved before massively parallel Internet computing can work commercially, McNett says. The biggest hurdle is security. An oil exploration company considering the mineral rights to some land might gain a lot of efficiency by divvying up the analysis of the geologic data across the Internet. But what's to stop a competitor from setting up machines in the network and gleaning some insights from the data?

And what about would-be saboteurs in the network, bent on ruining a project for competitive or malicious reasons? "There has to be a security model that is very easy, that doesn't allow a client machine to gain more insight than it should on the nature of a task and that can assure that no one client machine has enough grasp of the project that it can adversely affect the result," McNett says.

Another concern is that if people can modify the software's behavior, they can affect the project's integrity. SETI@home ran into this problem when some volunteers tweaked the software to improve its speed. Despite the users' good intentions, SETI scientists had to throw out the resulting radio-wave analyses because they couldn't vouch for their accuracy.

Finally, McNett says, massively distributed computing calls for a business model that has yet to gel. "Are you going to send 18-cent checks to 100,000 people every month?" he asks.

Albea says he thinks ProcessTree has solved most of the technical and business problems. For security, he plans to combine encryption with pieces of data so small that they would yield no useful information even if they were decoded. It may also randomly duplicate jobs and check for identical results. A discrepancy would indicate an error or sabotage.

Despite these precautions, Albea says security concerns will probably initially scare off some potential customers. He also notes that computer owners may have concerns of their own, but he points to SETI's ability to overcome user misgivings. "It gets down to trusting that we're a viable business with no interest in rifling their files," he says.

Meanwhile, even though ProcessTree hasn't yet set a pricing plan, CEO Steve Porter offers a ballpark figure of about $1,000 for the equivalent of a year's worth of CPU power from a Pentium II/400.

The company may pay in the range of $10 to $20 per month per computer — and even more for large-volume volunteers such as businesses. Payment will likely be in credits with an online retailer or service. For example, a participant might get discounts on his Internet service in exchange for running the software. "They're not going to be able to retire on this," Albea says, "but it's a resource just doing nothing, and instead they can be getting credits."

Since its site debuted in January — with virtually no advertising — ProcessTree has lined up more than 35,000 users representing more than 70,000 machines. "We are the largest body of available commercial computing power in the world right now," Porter says. "You can't get anything that can go faster than we can, and we get faster every day." ◗

MOREONLINE
For more on SETI, visit our Web site.
www.computerworld.com/more

DISTRIBUTED.NET'S Dave McNett says the power of his nonprofit organization's network of 190,000 machines equals the power of 42 144-node RS/6000s

MARC BERLOW

Potential Uses for Massively Parallel Internet Computing

INDUSTRY	APPLICATION
Manufacturing	CAD testing, stress testing, fluid dynamics, structural analysis
Engineering, energy	Seismic and geographic analysis prior to drilling or mining
Technology	Integrated circuit testing
Government, medical, educational, financial	Research, data storage
Entertainment	Animation rendering

UTER LIMITS'

ing thousands of PCs into a virtual, massively lications for business. By Kathleen Melymuka

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RICHARD BORGE

The Flavors Of Exec Ed

From private coaches to in-house universities, executive education is the key to leadership development and retention. It comes in enough varieties to satisfy everyone's taste. By Jill Vitiello

WHAT CAN TALENTED INFORMATION technology professionals do to improve their chances of making it into senior management?

How do growing companies retain and develop key IT professionals?

The answer to both questions can be the same: executive education. This special type of training comes in so many flavors, there's bound to be one to suit everyone's taste. Beginning with this issue, *Computerworld* will take a monthly look at the different types of programs available. Here's the scoop:

The term *executive education* is used to describe everything from a rigorous MBA program requiring years of commitment to a one-day course in leadership skills. Material covered is traditional management fare and is nontechnical in nature.

A Choice of Providers

Providers of executive education programs include universities, executive-training companies, industry organizations, consulting firms, corporate training departments and in-house "universities" and private career coaches. Their fees for imparting executive-level wisdom range from several hundred to several million dollars.

Most executive education is delivered in a traditional classroom style, and attendance is expected. Distance learning over the Internet and computer-based training are rare in executive programs.

Which Students Succeed?

IT professionals' ambitions for the executive suite aren't limited to one path, according to David Kinley, managing director of Canadian operations and a principal at Christian & Timbers, an executive recruitment firm in Cleveland that specializes in IT placements. "It's not the courses they've taken, but the fact that they continue to take courses," he says.

"The best executives show a thirst for knowledge and the ability to keep learning. Taking courses to upgrade skills will show up in their performance. The really good job candidates typically have executive education courses every year or two on their résumés," Kinley says.

The Flavors of MBA and University-Based Programs

The most rigorous route to an executive education is an MBA program. But even within this category, there are flavor variations.

Boston University, for example, has announced an MS/MBA program that combines a traditional MBA with a master's of science in information systems. The dual degree can be earned in the usual 21-month period required for a full-time MBA. The program is the first to offer a dual degree aimed at grooming technically savvy future CEOs. University officials say they expect 100 students to enroll for the first semester in the autumn of next year.

The typical full-time MBA student is approximately 28 years old, with a bachelor's degree and several years of experience in the business world, says Brandt Allen, dean of executive education at the Darden School of Business at the University of Virginia in Charlottesville. Not many are IT professionals.

"Often, IT professionals don't get the word that they have the potential to broaden themselves until they are in their late 30s — not the best time for people to take off for two years to earn an MBA," says Allen. Those who can't commit to a full-time MBA program may opt instead for a part-time program offered at night or on weekends. Usually, these programs duplicate the full-time program and take twice as much time to complete.

"Part-time MBA programs vary quite a bit in terms of quality," Allen warns. Look for a part-time program that has the same faculty and curriculum as the school's full-time MBA program.

Then there are executive MBA programs designed for older, more experienced people who work full time. These programs usually have less classroom time and content than a standard MBA. They are generally favored by IT professionals determined to get an MBA and by companies that support them with generous funding and time off to attend classes.

Controlling Content and Cost

"The war for talent is fierce — company secrets walk out the door daily," says Kinley. Companies that offer executive education to IT professionals demonstrate their commitment to developing their careers, which may increase loyalty, he says. Or maybe not.

In open-enrollment programs, students meet other like-minded individuals from many other companies. While this can stimulate ideas and lead to sharing best practices, another outcome is that IT professionals "might get swiped" by competitors, says Anthony Fresina, president of Executive KnowledgeWorks in Palatine, Ill. His company advises corporations on creating and managing their own in-house "universities" and provides custom executive education "interventions."

Industry organizations are another source of executive education.

"Most of our executives take advantage of seminars offered by the industry analyst firms," says Michael Caggiano, president of FutureNext Inc., an electronic-business solutions company in McLean, Va. "In a couple of days, we can learn what is going on real-time in the market."

Vitiello is a freelance writer in East Brunswick, N.J.

Deciding on a Flavor

For help with:	Visit this Web site:
Assessing executive education programs	*www.petersons.com/brickers/guidelines.html*

▸ Bricker's International Directory requires you to register, but the free advice is worthwhile.

Understanding the value of training	*www.astd.org*

▸ The American Society of Training & Development studies the impact and value of corporate training of every stripe.

Learning about education trends and options	*www.ft.com/education/*

▸ *The Financial Times* provides a global perspective on executive education.

Ranking and comparing business schools	*www.businessweek.com/bschools/index.html*

▸ *Business Week* ranks the nation's top MBA programs and executive education offerings. Links provide thorough information on top schools.

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PERSISTENCE PAYS OFF

As the distress of recruiting IT workers shows no signs of easing soon, it's forcing hiring managers to become a bit creative, highly flexible and a whole lot more persistent. By Dawne Shand

"IT'S GOOD TO BE KING," could easily be the mantra of information technology job seekers these days.

Job opportunities still easily outstrip available manpower.

To compete for talent, hiring managers and recruiters are responding to work/life trade-offs and offering increasingly flexible work situations.

But we've been in the midst of this skills crunch for three years now. Surely, something must be easing. Right?

To find out, *Computerworld* recently asked some IT managers, recruiters and job seekers what life on the labor front is like these days.

Hiring-Manager Hell

"It's been the week from hell," laughs Eileen Cassini, vice president of IT services at Harrah's Entertainment Inc. in Memphis, as she pumps a stress ball.

Twenty-four open positions in an IT organization of 260 is nothing to sneeze at. And attrition isn't the problem here; *Computerworld* ranks Harrah's as one of the top places to work.

But "you can only live on [being a] healthy workplace for so long," says Cassini. She's got work to do: Recruiting should consume no more than 10% of her time, but it's taking up 30%.

Cassini doesn't think that the hiring situation is getting worse; it's just a continuation of conditions of the past two years. She sees the same shortages at consulting firms, contract agencies and software and hardware vendors.

But these days, being a hiring manager requires even more creativity and tenacity than it used to — and a willingness to forego sleep on occasion.

The good news: Cassini says she considers consulting firms to be prime for picking because they haven't maintained the best work environments. Last December, she pursued a consultant who eventually turned down Harrah's offer because the job, at the time, wasn't fully formed. He chose to accept a more concrete offer.

A Harrah's recruiter called Cassini, who was vacationing in England over New Year's, to tell her the news. Cassini says she told the recruiter not to worry — the candidate would be working at Harrah's within three months. "When I find someone who fits our culture, then I don't consider that I have competitors," she says.

EILEEN CASSINI, Harrah's vice president of IT services, says she spends 30% of her time recruiting candidates to fill the 24 open positions in her department

JACK KENNER

Cassini says she knew this candidate and surmised that he wouldn't like his new job. She didn't give up. "It's all about winning that person over," she explains. And now he works at Harrah's.

Cassini tells another story about finding a talented consultant with a young family: "I knew she couldn't be happy with all the traveling, with her family situation."

Cassini found a way to work around the person's many constraints and offer her a job. Because of her day care situation, the woman couldn't take the job. "But I know she will some day work for us," says Cassini, firm in the belief that persistence and patience win out in the end.

Mike Walsh sure hopes so. The vice president of global human resources at State Street Corp. in Boston has 130 IT

COMPUTERWORLD'S 2nd Quarter HIRING SURVEY

positions open — and more than 1,000 in all departments. When asked if this makes him lose sleep, he jokes, "I haven't slept in months." Walsh says this is the toughest market for IT talent that he has seen in his 24 years in human resources.

These days, recruiting requires publicity. Walsh explains, "We have to do everything we can to market our opportunities and benefits." State Street bills itself as an attractive alternative to dot-coms because it provides a stable work environment and invests heavily in advanced IT systems. Local hipster radio stations in the Boston area broadcast ads for State Street's frequent open houses.

Walsh thinks job seekers are now looking harder for a mix of work and home/life options that suit their personal needs. And State Street is trying to satisfy those demands by offering everything from on-site day care to flexible work schedules and on-site dry cleaners.

Walsh believes these options are permanent necessities and not temporary perks that will disappear when skilled job candidates more closely match the job opportunities.

Contractor Contradictions

Two years ago, contracting and consulting was the market to be in. But Jim Schipelliti, a Web team leader and recruiter at Eliassen Group in Wakefield, Mass., says he thinks the blistering pace of activity in IT may be easing as interest rates slow economic growth.

Schipelliti says his workload has gone from complete insanity to manageable chaos since January. "After the new year, I had 40 to 50 [contract] openings staring me in the face," especially in server-side Java skills, says Schipelliti. Now he's filling 10 to 15 openings per week.

The pace at which Schipelliti must find and place people is what has changed the most during his 10-year tenure at Eliassen. Being a recruiter for contract positions these days means being able to find people fast and to get clients to act even faster in making an offer. "Someone who comes available and has Java experience can expect three to five offers in one week," Schipelliti explains.

Kirk Sears, co-owner of the Wilmington Group, a Wilmington, N.C.-based franchise of Management Recruiters International Inc., says he hasn't seen the same slowdown in recruiting full-time employees. If anything, he has seen recruiting — and his clients' fastidiousness — increase. They submit what Sears calls an "eight-headed monster" — a laundry list of traits that a candidate must possess.

"Five years ago, the rule was you could meet 60% of those traits — from personality to education to how they part their hair. These days, its more like 90%," explains Sears.

Sears has been recruiting IT candidates and biostatisticians for the manufacturing and pharmaceutical industries for the past five years. "We talk a lot of velocity of inventory," he says, drawing on the 10 years he spent as a general manager at a capital manufacturing company. "You almost have to have a just-in-time mentality" when it comes to finding people, he says.

That's a far cry from the old industry standard of "prime time," when recruiters worked banker's hours. These days, Sears starts making calls around 6:30 or 7 a.m. because that's when the movers and shakers are in the office. His days end approximately 12 hours later.

Job Seekers' Tales

Finding a job may not be difficult; but being laid off and forced to look for one isn't exactly fun. As more and more small software and dot-com companies fold, a small number of IT workers are finding themselves in the government's low-unemployment statistics.

If you do find yourself among them, should you be worried? Probably not. But when looking for the next job, the vital considerations for many job seekers aren't the odd perks, like bringing dogs to work. More often, it's just some flexibility, say staffing experts.

Rob Iannuzzi, 26, had a few hours' notice that the Boston-based dot-com retailer where he had been a site producer would be shutting its doors. He says a few colleagues were upset, but he'd been there more than two years and was ready to move on anyway.

Iannuzzi has been laid off from two e-commerce start-ups since entering the workforce four years ago. After he lost his first job, he posted his résumé on the Monster.com and HotJobs.com career sites, which generated perhaps a dozen leads. It took him a month to find another position.

In May, he used the same strategy. "I posted the résumé on a Tuesday at 5:30 and left the house to join friends for dinner. My phone began ringing on the walk to the restaurant," Iannuzzi says. He eventually stopped answering his phone because four or five recruiters were calling daily. Hundreds of e-mails flooded his in-box.

Iannuzzi sought two key factors in his next employer: short-term project-based work and access to public transportation. Two weeks after beginning his search, he accepted a job as an information architect at a consulting firm within a short train ride from his home. ◗

Shand is a freelance writer in Arlington, Mass.

IT Hiring Projections by Major Industry

INDUSTRY	NUMBER OF COMPANIES SURVEYED	AVERAGE NUMBER OF IT STAFF	THREE-MONTH STAFF HIRING PROJECTION	12-MONTH STAFF HIRING PROJECTION	AVERAGE NUMBER OF IT TEMPS	THREE-MONTH TEMP HIRING PROJECTION	12-MONTH TEMP HIRING PROJECTION
Publishing	43	180	+25%	+1%	12	0%	+2%
Computer manufacturers	42	979	+14%	+12%	59	+7%	+11%
Transportation/ utilities	151	471	+14%	+6%	81	-3%	-3%
Education	182	211	+11%	+2%	85	-14%	-10%
Software development	115	167	+9%	+27%	10	+7%	+11%
Health care/ medical services	138	350	+8%	+1%	9	-5%	0%
Construction/ petroleum	46	736	+4%	+1%	16	-3%	+2%
Manufacturing	310	168	+1%	+6%	22	+2%	-4%
Value-added resellers	81	759	0%	+25%	13	+28%	+22%
Insurance/ financial	164	330	0%	+9%	46	+6%	+19%

IT Hiring Projections by Region

REGION (states)	NUMBER OF COMPANIES SURVEYED	AVERAGE NUMBER OF IT STAFF	THREE-MONTH STAFF HIRING PROJECTION	12-MONTH STAFF HIRING PROJECTION	AVERAGE NUMBER OF IT TEMPS	THREE-MONTH TEMP HIRING PROJECTION	12-MONTH TEMP HIRING PROJECTION
New England (Conn., Mass., Maine, N.H., R.I., Vt.)	94	258	-2%	+6%	184	0%	+33%
Mid Atlantic (N.J., N.Y., Pa.)	293	1,926	-2%	+30%	97	+25%	+32%
South Atlantic (D.C., Del., Fla., Ga., Md., N.C., S.C., Va., W.Va.)	321	3,621	0%	+7%	167	+35%	-6%
East North Central (Ill., Ind., Mich., Ohio, Wis.)	296	262	+18%	+40%	26	+45%	+11%
East South Central (Ala., Ky., Miss., Tenn.)	64	111	+4%	+10%	17	0%	0%
West North Central (Iowa, Kan., Minn., Mo., N.D., Neb., S.D.)	132	160	+2%	+12%	54	+1%	+4%
West South Central (Ark., La., Texas)	157	126	+2%	+11%	12	+19%	+27%
Mountain (Ariz., Colo., Idaho, Mont., Nev., N.M., Okla., Utah, Wyo.)	136	1,435	+3%	+12%	70	+14%	+5%
Pacific (Alaska, Calif., Hawaii, Ore., Wash.)	304	266	-1%	+8%	46	-8%	-6%
Total	1,797	-	+3%	+15%	-	+14%	+11%

Methodology

National Survey of IT Leaders

Computerworld's National Survey of IT Leaders is mailed to more than 4,000 IT professionals each month. The survey asks about IT budgets, current IT head count, hiring needs and the importance of a number of technologies over time. Respondents are asked about their current permanent and temporary IT head counts, as well as their anticipated head counts in three months. The data presented here represents the responses of 1,797 organizations in the U.S.

KNOWLEDGE MANAGEMENT MISTAKES

Experts reveal five pitfalls to avoid when starting down the knowledge management path.

By Johanna Ambrosio

KNOWLEDGE IS POWER, especially in the Internet age. That's why companies are trying to figure out precisely what their customers want and how to get it to them before the competition does. Whatever you call it — collaboration, decision support, knowledge management or something else — it's the bedrock that's supporting today's corporate strategies.

Trouble is, many of these costly, information-laden efforts are doomed. Some researchers peg the failure rate of knowledge management projects at 50%. But Daniel Morehead, director of organizational research at British Telecommunications PLC in Reston, Va., says the rate is closer to 70%.

"Most knowledge management projects simply don't hit their stated goals and objectives," Morehead says. "So that 70% doesn't mean they fail totally — it means that they don't accomplish what they set out to do."

Liam Fahey, an adjunct professor at Babson College in Wellesley, Mass., says the higher failure rates can be attributed to knowledge management (KM) initiatives that rely too heavily on technology. Just moving data around "may or may not add value to anyone in the enterprise," Fahey asserts. "Until you've affected someone's understanding of their current or future world, it's not knowledge."

Brian Hackett, a program manager at The Conference Board Inc. in New York and the author of a recent report on the topic, says the most successful KM programs focus on building deeper customer relationships and increasing the speed of innovation. He calls this Phase 2 of KM, the first being an emphasis on saving money. London-based BP Amoco PLC and Dearborn, Mich.-based Ford Motor Co. have each saved more than $600 million over the past three years by implementing KM programs, Hackett says.

BP Amoco, for example, saved $50 million in drilling costs at the Schiehallion oil field off the coast of Scotland by leveraging knowledge it had gained from developing prior oil fields.

Here are five KM mistakes and how to avoid them:

MISTAKE NO. 1: The most common error is failing to coordinate efforts between information technology and human resources. Don't fall into the trap of framing the KM effort as either a technology problem or a people problem. It isn't an either/or situation — KM needs both to succeed. Witness the U.S. Postal Service, which wound up with a fairly successful KM program in spite of itself.

The Postal Service's human resources group was starting down the KM path when it discovered that the IT group had already done so — so the two teamed up. "There were two huge functions in our organization trying to chase this thing, and we weren't talking to each other," says John Milatzo, a program manager at the William F. Bolger Center for Leadership Development in Potomac, Md. "We didn't go asking, 'Who else is doing this?' But neither did they." The message: Don't be proud. Neither side can — or should — go it alone.

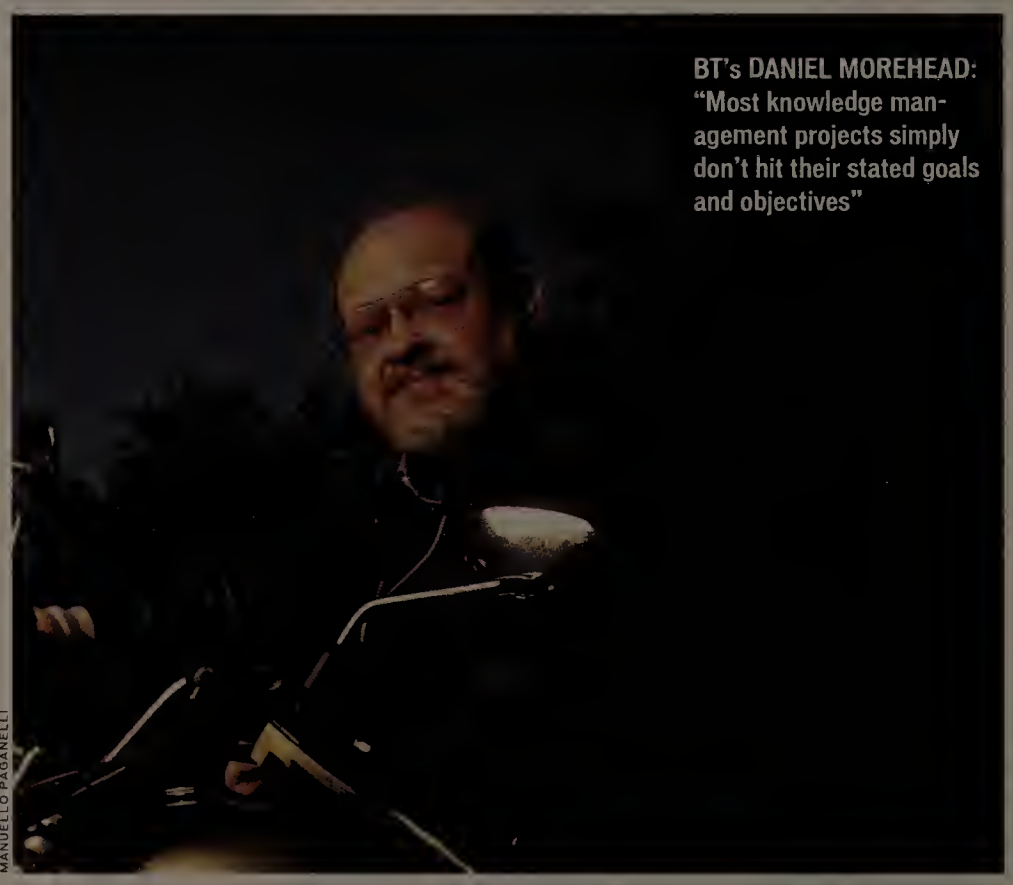
MISTAKE NO. 2: Starting with a low-profile project. "To get the greatest leverage in the organization, start with a high-value business problem," suggests Scott Beaty, a knowledge manager at Shell Oil Co. in Houston. "Increased sales, for instance. Create an electronic sales partner to put all the company's knowledge at their salespeople's fingertips — technical product information, previous history with the customer, competitive information." Organizations can then build on that project's success to get more funding for another KM endeavor.

MISTAKE NO. 3: Not changing the compensation scheme to reward teamwork. At most companies, annual reviews, bonuses and other forms of recognition are based on an individual's accomplishments. That's fine if you want to reward the same old information-hoarding practices. But consider Viant Corp., an Internet strategy and consulting company in Boston.

"We have eight different ways to earn stock, and five are directly related to growth and learning," says Chris Newell, the company's chief knowledge officer. In addition, Viant's annual merit increases and bonuses are based on the performance evaluations of an employee's team members and other peers in addition to supervisors — a so-called 360-degree review.

MISTAKE NO. 4: Building the grand database in the sky to house all your company's knowledge. Instead, think "communities of practice," to use an in-vogue KM term. Figure out who works together regularly because they have a job in common and then find out what they want or need to know to be more successful or to save time. Then provide that information — through databases, easy-to-use front-end tools and other means — so users can act on the information. Remember, it's only knowledge if someone actually does something with it.

MISTAKE NO. 5: Assuming someone else will lead the charge. They won't. Change needs a champion, and you're it. ◗



MANUELLO PAGANELLI

BT's DANIEL MOREHEAD: "Most knowledge management projects simply don't hit their stated goals and objectives"

Using Knowledge Management

According to a recent survey conducted by KPMG Consulting LLC, many companies have begun using knowledge management to improve their competitive advantages and to benefit their bottom lines. Out of 423 organizations surveyed in the U.K., continental Europe and the U.S.:

81% said they had or were considering knowledge management programs.

38% already had such programs in place.

30% were setting up one.

13% were examining the need for such programs.

More than **60%** of organizations with knowledge management programs said they've seen faster response to key business problems or have delivered better customer service.

Ambrosio is a freelance writer in Marlboro, Mass. Contact her at JohannaAmbrosio@aol.com.

Collaborative Commerce

DEFINITION

Collaborative commerce is the use of an online business-to-business exchange to facilitate the flow of information rather than to process transactions. Business partners can exchange information such as inventory data by using a Web server as an intermediary. In many cases, collaborative commerce simplifies data interchange by eliminating the need for special client software at each customer's site.

BY STEVE ALEXANDER

THE ARRIVAL of business-to-business exchanges on the Web has created new ways for business partners to work together. By using Web servers as hubs for collaborative commerce efforts, companies are seeking to exchange proprietary data, jointly manage projects and cooperate on the design of new products.

Collaborative commerce should help companies forge long-term relationships while reducing the costs of cooperation, says Lisa Williams, an analyst at The Yankee Group in Boston. For example, a Web server hub could substitute for distributed groupware for jointly managing projects such as constructing a building. "Instead of all the partners buying the same groupware product, they'll all just sign on to the Web site," she says.

While the Web server wouldn't be as functional as groupware, it could have other advantages. "Groupware might not work for everybody, particularly if you've got a 200-person shop working with a two-person shop," Williams says.

But while collaborative commerce has the potential to be the next big trend in partnering, it's just beginning to take shape, says Stan Lepeak, an analyst at Meta Group Inc. in Stamford, Conn.

One barrier is the technology learning curve. "Running a distributed design process among business partners using a Web site as a hub is tough," says Lepeak. "Most large companies are just figuring out how to do that inside the walls of their own corporations. When you go outside the firm, there are lots of issues about technology, security and authorization."

Another barrier is that the idea is new to businesspeople. "Executives are starting to buy into the idea, but it will be years before it's commonplace," Lepeak says.

Some experts say collaborative commerce will make it easier for smaller companies to partner with larger ones, since using a Web server as the data-transmission intermediary may eliminate the need for expensive private networks or electronic data interchange.

Collaborative commerce has "changed who can play," says Anthony Abbattista, a managing director at Chicago consulting firm Diamond Technology Partners Inc. "You don't need huge IT departments writing interfaces in order to get this information in and out of your computer system."

Collaborative commerce may also speed up business cycle times. A big automobile company that can automate the flow of paperwork among its suppliers might increase its efficiency by dealing with all of them in a uniform way. But it's unclear how well this would work in practice because not all paper-based business processes can be automated.

"If you've got specific guidelines for reviewing a document, that can be automated. But if your document review involves having a team look at the document, it's tough to automate that," Lepeak says.

One believer in collaborative commerce is Nels Wroe, Internet services product manager at SHL USA Inc. in Boulder, Colo. The human resources company provides job applicant screening information to its clients via collaborative commerce. Web server software from Casahl Technology Inc. in San Ramon, Calif., allows SHL to share job candidate data through whichever application its customers prefer. The Casahl software handles the translation to the various data formats.

"Instead of having to invest the time that would be required to build our hooks into a lot of other systems, we can use a single tool and a single group of IT people. As a result, our cost per transaction goes down," Wroe says. "The alternative would be for every client of ours to have special software or for us to write hooks into their systems."

SHL also appears to have solved one of the major concerns about collaborative commerce: security. Wroe says the technology lets SHL pull data from client systems to see how well job candidates did after they were hired, while security-conscious customer firms tightly control the outflow of their employment data. So far, it's been working.

Another user of collaborative commerce is Ensco Inc., a

> You don't need huge IT departments writing interfaces in order to get this information.
>
> ANTHONY ABBATTISTA, DIAMOND TECHNOLOGY PARTNERS

Lincolnshire, Ill.-based firm that disposes of hazardous chemical wastes from manufacturing plants. Customers are interested in keeping track of the disposal process because they retain legal responsibility for their waste materials, says Terry Triplet, the firm's electronic business manager in El Dorado, Ark.

"We want to share information from our legacy systems with those companies — information customers could never look at before," Triplet says. "You've just about got to do business this way nowadays, because not many companies are going to survive if they don't give the customer this kind of ability."

Alexander is a freelance writer in Edina, Minn. Contact him at sorion99@yahoo.com.

Collaboration Among E-Business Partners

Collaboration commerce requires that data such as product pricing, inventory, shipping status, credit and financial information be shared among business partners. This diagram shows how relationship managers at **Company A** can use their familiar workgroup application to interact with the enterprise applications of **Company B**. In this case, Casahl Technology's ecKnowldge software translates the enterprise data for the workgroup applications.

SOURCE: CASAHL TECHNOLOGY INC., SAN RAMON, CALIF.

■ *Are there business terms you would like to learn about in QuickStudy? Please send your ideas to quickstudy@computerworld.com.*

Dear Career Adviser:

I'm a nondegreed information technology professional with 10 years of experience in the industry, five of them with Windows NT. I make very good money but lack the required sheepskin that most companies look for. I'm finding it increasingly difficult to land an interview. Most rejection letters I get state that I'm either not qualified enough, have no degree or make too much money. My wife keeps pestering me to get my degree and my MCSE, and I'm working on both. Is this the right course?

— HENPECKED HOWARD

Dear Howard:

Your wife gets an "A" for her "honey-do" list, because she's right! In this job market, your toughest competitors have degrees and credentials that you lack. You'll be left behind if you don't remedy that soon.

While your experience on the front lines may be the best teacher, it simply won't generate maximum opportunity or pay. Randy Rudolph, director of IT at San Francisco International Airport, says, "In my department, we require experience and a four-year degree for entry-level technicians."

In short, find an exciting company to work for that has a tuition-reimbursement plan, says Rudolph, and keep on going until you finish.

Dear Career Adviser:

With only a few more years until retiring from my first career and a wide variety of skills and experiences, I am trying to home in on a second career.

I have a bachelor's degree with a minor in computer science and more than 17 years in IT, thanks to the U.S. military. I have mainframe operations, quality control, systems programming and database experience.

I have also transitioned to networking by managing a metropolitan-area network with more than 400 servers and worked as a project manager for a network help desk software application. Now I'm managing software development teams for supply-chain management applications. Outside of the military, where should I focus, and am I someone who will be hired at a decent rate of pay?

— SECOND CAREER

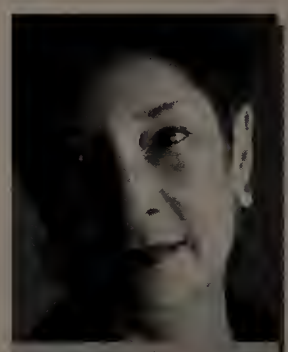
Dear Second:

You might be stuck in "dinosaur" technology that isn't easily transferable to today's IT environments, says Tom Knepell, a former commander in the U.S. Navy who had a successful career in software consulting and then founded Information Systems Group, a software firm in Oakland, Calif.

Knepell notes that government environments are frequently created by the lowest bidders and have equipment and systems not often found in commercial sites.

Second, there is a bias by many hiring managers against IT developers who haven't worked in profit-motivated organizations. Whether justified or not, Knepell says, the fear is that funding and costs aren't a concern for government employees.

Finally, people who are retiring from the military or government should never say in résumés or interviews that they retired. Those are just the facts.



FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_adviser.

"Target government contractors and large companies setting up Web servers on mainframes," says Knepell. These large mainframe Web server projects currently being implemented would be a great place for you to get that transition job. Use it to learn new skills and, one bounce later, wind up where you really want to be.

Dear Career Adviser:

Is there a future for assembler programmers? I have delivered client-specific solutions using IBM/370 assembler for more than 14 years and am wondering how much longer this skill set will be needed/desired in today's workplace. I am currently thinking about learning SAS. Is this a good career move?

— ASSEMBLER ANTIQUE

Dear Antique:

Although you've waited a long time to wake up, you actually have more choices than you think, because assembler emphasizes a structured methodology. If you're interested in statistical programming and analysis or in learning a system that has a fully articulated delivery infrastructure, particularly in the pharmaceutical industry or in an industry emphasizing statistics, SAS could be a good choice, says Hugh G. McCabe, director of health care analysis at Univera Healthcare in Baldwinsville, N.Y.

First, SAS is in the information-delivery business, and you can use it for data manipulation, data reduction, ad hoc reporting and delivering reports. But you have other choices as well.

Again, with your structured-language background, "if you have the discipline and smarts to learn assembler, you could move to SAP or go into network engineering," says John Margaronis, director of IT at Health Net Health Plan of Oregon Inc. in Clackamas, Ore.

In other words, either learn how to support a network operating environment emphasizing Novell, Microsoft SQL Server and Cisco classes, or get into application programming, or both. ◗

BRIEFS

Yahoo Goes Corporate With Info Portal

Yahoo Inc. last week announced a new enterprise information portal called Corporate Yahoo, which will let companies offer customized Web pages for employees that combine corporate information with Yahoo's content, such as news headlines and stock quotes. The portal, developed in conjunction with Tibco Software Inc. in Palo Alto, Calif., resides behind a corporate firewall, making it possible to integrate information from a company's intranet, databases and enterprise applications without security risk, said company officials. Yahoo said four customers have signed up to use the new service. But only one, the North Carolina state government, isn't also listed as a supplier or business partner of Yahoo.

SupplierMarket.com To Bolster Exchanges

Ariba Inc. last week announced it will buy privately held SupplierMarket.com in a stock deal worth approximately $580.8 million. Ariba said the SupplierMarket.com deal will bolster its Internet-based technologies that allow customers to find new trading partners, negotiate contracts and collaborate online. Burlington, Mass.-based SupplierMarket.com specializes in collaborative sourcing, focusing on materials issues in various vertical markets. Ariba will issue approximately 6.3 million shares of stock for the purchase. The deal is expected to close in the third quarter.

Meta Group Unveils Global E-Index

Meta Group Inc. in Stamford, Conn., last week unveiled the Global New E-Economy Index, a measurement of the technological production and potential of 47 countries. The index is based on such factors as the number of qualified engineers and higher-education students in a given country, the average number of patents and money spent on research and development each year, the number of Internet service providers and the availability of venture capital. The U.S. ranks first on the index, followed by Japan, Germany, France, Finland, Canada and the U.K. At the bottom of the index are South Africa, Venezuela, Slovenia, Thailand and Indonesia. The index is located at *www.metricnet.com.*

Patagon.com Moves Into U.S.

Latin American Patagon.com International Ltd. entered the U.S. market last week with the acquisition of KeyTrade Online for an undisclosed price. The purchase of the online discount brokerage company helps Patagon.com – which offers online financial services and information in Argentina, Brazil, Spain, Mexico, Chile and Venezuela – move forward with its global expansion. Patagon.com has had much success in the U.S., raising more than $60 million in financing from companies such as J. P. Morgan Capital and The Goldman Sachs Group Inc.

Yahoo Taps Google

Yahoo said last week that it will use Google Inc. for its search services instead of its former provider, Inktomi Corp. The news comes on the heels of Mountain View, Calif.-based Google's claim that it is now the world's largest search engine, with more than 1 billion Web pages indexed. Rivals range from 214 million pages (Excite Inc.) to 600 million (Lycos Inc.), according to data at *www.searchenginewatch.com/reports/sizes.html*). Inktomi has 500 million pages, said Paul Hagen, an analyst at Forrester Research Inc. in Cambridge, Mass.

TECHNOLOGY

Q&A: IBM'S STEVE MILLS

IBM software executive Steve Mills says Microsoft's latest middleware and application development tools show that Microsoft understands the need to connect to systems from other vendors. ▸ 48

PATCH FLAP

A Microsoft patch aimed at fixing a previously discovered ActiveX flaw may not fully protect users, according to Carnegie Mellon's Computer Emergency Response Team. But Redmond insists that the patch remedies the vulnerability when users follow basic security procedures. ▸ 48

THE FUTURE IS NOW

At its OpenView user conference, Hewlett-Packard announced that it's headed in a new direction, toward a focus on e-commerce. But the IT managers in attendance seemed most interested in the products that can help them solve problems now. ▸ 50

MEMORY MAGIC

IBM last week announced what it termed an "industry breakthrough" with a chip designed to compress data and effectively double a computer's memory. IBM is selling the technology through another chip company in the hope that the new technology will develop into a standard used by all PC vendors. ▸ 51

QUICKSTUDY

Named after the three-headed watchdog that guards the gates to Hades in Greek mythology, Kerberos is a network authentication protocol that lets computers verify one another's identities across insecure networks such as the Internet. ▸ 52

SEARCH POWER

With the Web increasingly becoming the center of the IT universe, search engines are taking on more and more complex business functions. How do IT managers choose the engines that drive e-commerce sites and corporate intranets? ▸ 56

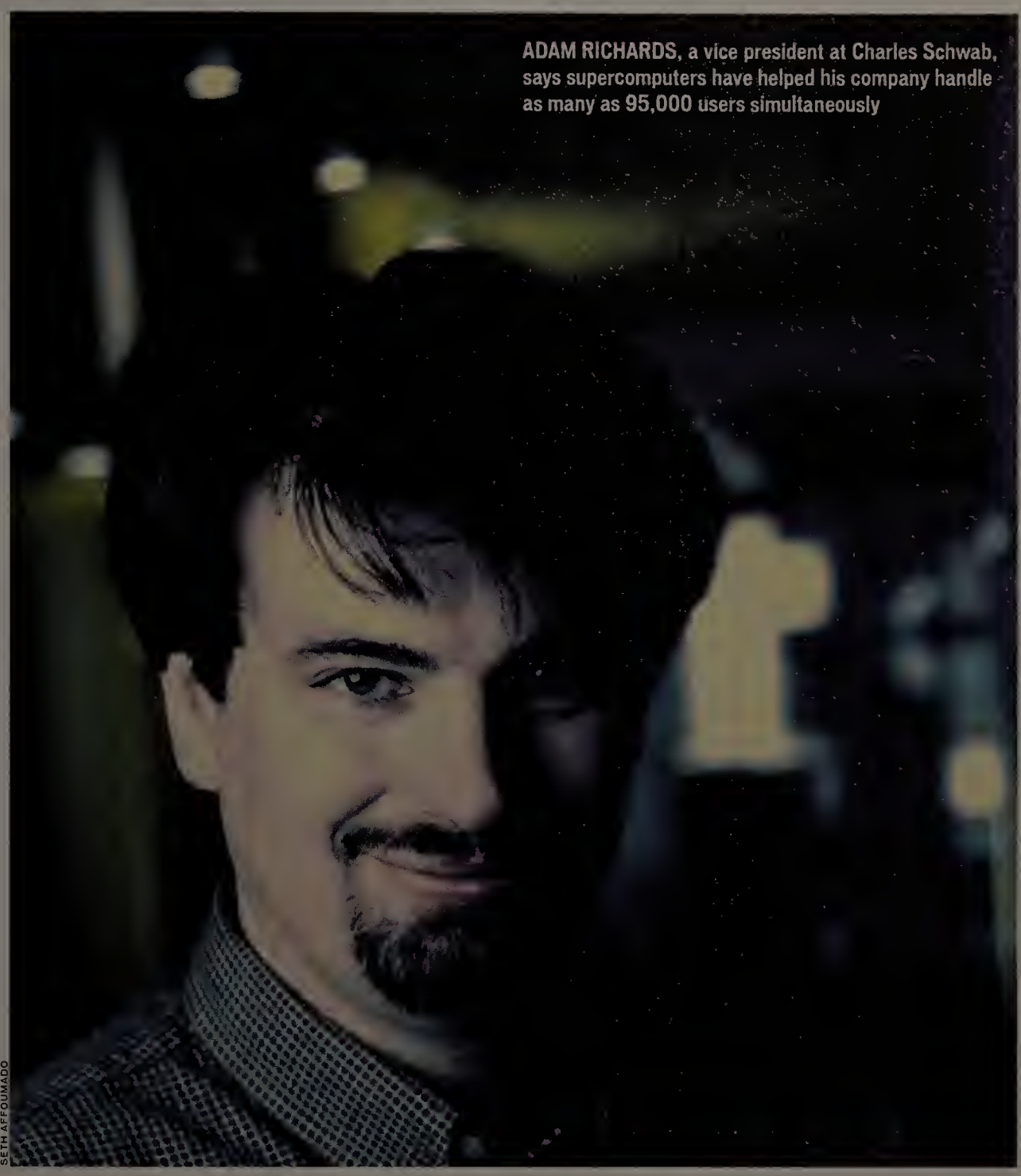
WORTH THE PRICE?

"Free" Web services such as instant messaging, e-mail lists and storage can give business users a cost-effective complement to existing information services — if users can accept the limitations. ▸ 60

EMERGING COMPANY

Start-up DataCore Software says its SANsymphony storage-area network (SAN) software can pool existing disk resources running under many different network operating systems and manage them as a single resource — all for a fraction of the cost of traditional SANs. ▸ 62

MORE
Skills Scope..... 64



ADAM RICHARDS, a vice president at Charles Schwab, says supercomputers have helped his company handle as many as 95,000 users simultaneously

SETH AFFOUMADO

COMEBACK TO THE FUTURE

AFTER YEARS OF BEING OVERSHADOWED by the PC revolution, supercomputers are the focus of increased interest for business applications. In fact, very-high-performance computers are moving out of their exile in academia and into mainstream IT shops, where they are doing the heavy lifting for e-commerce applications.

54

IBM Exec: Microsoft Sees Need for Interoperability

Says Microsoft's latest plans show how much it needs to link to other platforms

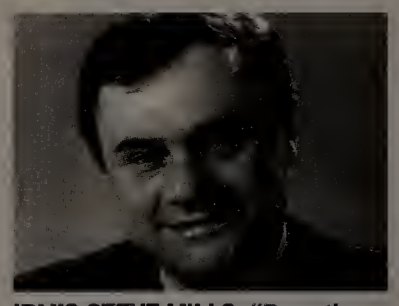
IBM HAS LONG prided itself on supporting multiple computing platforms, including Java and Microsoft Corp.'s Windows NT. The company got a new platform and a new language to support last week, when Microsoft unveiled its Microsoft.Net architecture for linking applications and its new C# development language. *Computerworld* senior editor Lee Copeland spoke with **Steve Mills**, general manager of IBM's Software Solutions division, about Microsoft's plans.

Q: IBM already supports Microsoft technologies such as Windows 2000. How might it support C#?
A: We will certainly have to deal with it in the Windows world as we do with other things that they deliver on their systems. Their development tools, for example, we use to build applications against our middleware products, like Websphere.

Q: What about Microsoft.Net?
A: What I see in Microsoft.Net is not Microsoft changing their own architecture, but bringing much more focus to having their ... environment more connectable and adaptable to a heterogeneous Web world. It's very much an issue of how Microsoft products will adapt themselves to changing paradigms.

Q: Microsoft.Net seems to be middleware that could tie Microsoft systems more closely. Do you think that could evoke the ire of the U.S. Department of Justice?
A: Microsoft already has a wound-up system today, as opposed to the modular approach you see in the Unix world, where you can mix and match pieces. So this is a continuation of that kind of a system infrastructure environment and encouragement of developers to — through the Microsoft tools — use the environment that Microsoft delivers, as opposed to Microsoft delivering a collection of pieces and presenting them to the market as a menu.

[Microsoft continues] to drive this notion of a highly integrated system, which might seem to be appealing in terms of what might be perceived as better integration and ease of development but presents other problems in that it is a huge stack of code. It's very hard for them to get new things out into the market because of all the interdependencies ... and it



IBM'S STEVE MILLS: "Does the world want yet another programming language?"

carries performance penalties.

Q: Are you surprised that Microsoft didn't go with Java to achieve interoperability?
A: In my opinion, they made a mistake on that. They view Java as upsetting the fidelity and control point that they have in Windows and view Java as a competitor. C# may be a good piece of work. It's not a matter of whether they have done the work on it, but does the world want yet another programming language? Does the world feel that it needs yet another interoperability language?

Java is out there and fairly well-entrenched in the market. XML has emerged for doing mapping, although it's not a true programming language. It's certainly a useful mechanism for interoperability. So the question is, why another one, and I think the *why* is because [Microsoft] decided not to use Java.

Q: We have talked with a number of developers who are concerned about learning another language.
A: I think the Windows-centric developer might find this useful because the C and C++ environment is a fairly complex one. One of the problems you see developers having is coming from the Visual Basic world. They find the transition to a pure C/C++ environment difficult, but yet they have to make that transition if they want to build more scalable server-side applications.

Because Visual Basic is not a strong server-side programming language, it was never really designed to provide the kind of shared, multitasked and multiprocessed environment that is typical of what you write in C.

Q: What types of challenges do you think C# will address?
A: C# does address the issue of improving developer productivity and programming in C environments. There are certainly positive attributes ... but for anybody who is thinking multiplatform there is Java. They can run Java on NT and other platforms, so why would they want C#?

Microsoft, CERT at Odds On Internet Explorer Patch

Vendor insists that users are protected from security flaw

BY JAIKUMAR VIJAYAN

A Microsoft Corp. patch aimed at fixing a previously discovered ActiveX flaw may not fully protect users against the vulnerability, according to an advisory issued late last month by Pittsburgh-based Carnegie Mellon University's Computer Emergency Response Team (CERT).

But a Microsoft spokesman insisted that the patch released by the company on June 2 provides protection against the vulnerability in all circumstances where users follow basic security procedures.

The disagreement involves a little-known but potentially serious flaw that was discovered in mid-April with an ActiveX-based shortcut control in the HTML Help feature built into Microsoft's Internet Explorer Web browser.

The shortcuts allow HTML Help files to link to and execute code that helps users understand how to perform certain tasks, said Shawn Hernan, a CERT member.

But under certain conditions — which are described by CERT in its advisory — the feature can be exploited by crackers to plant a malicious help file from a remote location onto a user's system.

Basically, "someone who can exploit this vulnerability can [remotely] do anything you can do on your computer" if the conditions apply, Hernan said.

Microsoft's Statement

Earlier this month, Microsoft's own description of the flaw and announcement of the patch acknowledged that attackers exploiting the security hole "could take any actions that the user could take, including adding, changing or deleting data, or communicating with a remote Web site."

Scott Culp, a Microsoft security program manager, said the company's patch eliminates the vulnerability by allowing an HTML Help file to use shortcuts only if the file resides on a user's PC. That should provide ample protection as long as users stick to basic security practices such as having a secure firewall and not accepting files from unknown sources, he said.

The security flaw can only be exploited under very rare circumstances and, even then, only if the user actively downloads a malicious file from a remote location, Culp added.

"CERT's advisory oversimplifies the steps that an attacker would need to exploit the flaw," he said. "The scenario they're postulating would open users up to a far broader range of security issues above and beyond this vulnerability."

Not Uncommon

But CERT claimed the preconditions needed for the vulnerability to be exploited aren't that uncommon and pose a greater threat than Microsoft describes.

"For some sites, the patch provided by Microsoft is adequate," CERT said in its advisory. "For others, particularly those sites using non-Microsoft networking products, the patch does not provide complete protection."

Users need to understand their networks' configurations prior to deciding which, if any, changes are required beyond installing the patch, CERT added.

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Users Focus on Current Products as HP Looks Ahead

BY SAMI LAIS
ORLANDO

At Hewlett-Packard Co.'s OpenView 2000 user conference here last month, company officials offered information technology managers an image of a more innovative HP focused on e-commerce, but most attendees homed in on new features in network management software that could help them solve existing problems.

Patty Azzarello, the OpenView division's general manager, insisted that the new focus hasn't hurt development of the company's existing line. At the conference, HP announced two OpenView products that are being released this month: Express 2.0, a new version of the company's network management software package for Windows NT environments, and VantagePoint 6.0, a suite of e-commerce software tools.

Users like Jim Hanrahan, enterprise services director at application service provider Elcom.com Inc. in Norwood, Mass., said he agrees that HP's development of current products remains on track. As his OpenView implementation progressed, he found gaps in functionality, Hanrahan said, but each time, HP had anticipated the need "and was already working on it."

"We're so large, we've had problems in the past with tools scaling up," said another OpenView user. HP is working with his company to ensure that its new tools scale up, he said.

Gay Sherman described her implementation of HP's fixed time-and-cost OpenView Express 1.0. (The $26,795 price and three-weeks-or-less implementation guarantee won't change for Version 2.0.) She said she had been struggling to bring IT systems under control for the Orange County, Fla., school district, where she's a senior network administrator. Her 10-person staff supports e-mail and Internet access for 175,000 teachers and students at 180 sites.

When her proposed budget for management software melted away, she turned to freeware and enrolled the district in beta programs for Windows 2000 and Veritas Software Corp.'s backup software. "We were running betas on betas with different expiration dates, we had patches on patches and we were having some problems," Sherman said. "It wasn't good."

It took three days to implement the ManageX component of OpenView Express for NT and Windows 2000 system management, Network Node Manager for network infrastructure management and OmniBack for backup, she said.

Express is aimed at midsize businesses but has a place in large enterprises, managing NT systems, said Corey Ferengul, an analyst at Meta Group Inc. in Stamford, Conn. Express' visualization of the Microsoft Exchange system "is unique and makes it easy to see," Ferengul said. But because Exchange is "the No. 1 application on NT," it's a hot market, with several vendors vying for supremacy, he said. "BMC Software has a new module that does root-cause analysis on Exchange," Ferengul said.

As for the snazzier HP, the OpenView division is developing eSpeak, which Azzarello described as "e-services" business-to-business software. It will search the Web, match similar e-commerce transaction services and broker transactions among them, she said.

"It has a long way to go," Ferengul noted. "But it's still in early stages of development." ◗

AT A GLANCE

HP's OpenView

Upgrades released this month:

OpenView Express 2.0

- Free one-day, on-site evaluation; HP installs Express on users' systems.
- Microsoft Exchange support
- Fixed price: $26,795 for software and implementation services

OpenView VantagePoint 6.0

- Security: public-key infrastructure and Secure Sockets Layer support
- Active monitoring of Web application response time
- Price: starts at $2,000

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Talk About Laptops . . .

Tired of balancing your notebook PC on the passenger seat while you're stuck in traffic? Do you want to really impress clients when you take them to lunch? Q-PC Real Car Computing, which has provided ruggedized gear for missiles and the U.S. Army, is offering what it claims is the world's first Windows 98-compatible PC available for cars, shown here gracing the dashboard of a Mercedes E320. The base PC – with a 450-MHz processor, 64MB of RAM and a 10GB hard drive – costs $2,895, not including installation. The Huntsville, Ala.-based company can be reached at *www.Q-PC.com*.

– Robert L. Scheier

IBM Claims New Chip Technology Doubles PC Memory

BY MICHAEL MEEHAN

IBM last week announced a chip technology that it said can effectively double the memory in a PC server.

Called Memory Expansion Technology (MXT), the new memory-controller chip will reside between the processor and the main memory on a server's motherboard.

The most frequently accessed data is stored on the controller chip for rapid transmission. The controller chip sends data that is used less frequently to the computer's memory, rather than to a slower-performing disk as in current server architectures.

IBM's research division claimed that MXT has the ability to double the memory of the standard PC based on Intel Corp. technology.

The first servers to use the new technology should be available by early next year, IBM said.

The company also said that data stored by the device can be decompressed in nanoseconds.

To make it work, Big Blue adapted an available serial-processing algorithm that can be built directly into the chip, said Ellen Yoffa, IBM's director of personal and scalable systems research.

"Others have tried to boost memory in the past, but the reason they failed where we succeeded is [that] they attempted to do this using software," she said.

IBM'S MXT MEMORY-CONTROLLER chip will replace the one on the top left in this associated chip set

Performance Boost

With IBM's approach, Yoffa said, performance should be much faster "because you no longer have to go off to a disk to retrieve your data."

The added processing demands required by the MXT technology create a maximum overhead of 3% on a system's resources, she noted.

ServerWorks Inc., a Santa Clara, Calif.-based company that develops logic chips for Intel-based systems, has signed a five-year deal under which it plans to incorporate MXT into servers and eventually into handheld and other devices for IBM and rival vendors. "Our goal is to have MXT pervasive throughout the industry," Yoffa said.

Mark Melenovsky, an analyst at International Data Corp. in Framingham, Mass., called the new technology "a definite innovation."

He said IBM's willingness to let an independent company such as ServerWorks market MXT to other vendors gives the technology the potential to become a standard.

But Melenovsky said MXT's pricing will be key to its success. If the cost is too high, server vendors might decide it's cheaper in the short term just to add more physical memory, he said.

Raju Vegesna, president and CEO of ServerWorks, said his company intends to keep the price low in order to push the chip as a standard.

According to Vegesna, the company's high-end chip set could be sold to computer vendors for no more than $265 per system.

Nathan Brookwood, principal analyst at technology research and consulting firm Insight 64 in Saratoga, Calif., predicted that the retail markup will be minimal because the chips will be available to rival vendors as well as to IBM.

He also said the chips could make PCs more affordable, since "memory's the most expensive part of a system."

The real challenge will be convincing computer manufacturers that the chips deliver the benefits of more memory without soaking up so much processing power that there's no real benefit to users, Brookwood explained. "It's really pretty complicated stuff under the hood. That's why no one's done it," he said.

The chips initially are being designed for use in Intel-based servers such as IBM's Netfinity line, but the company is also looking to incorporate the technology into data transaction and Web application servers and wireless devices.

Frank Garvin, vice president of network and systems engineering at Pleasanton, Calif.-based MegaPath Networks Inc., a Digital Subscriber Line provider, said doubled memory could reduce costs and add efficiency for server-driven businesses.

"When you start talking about Web hosting — and quite candidly, that's an area we're looking at — I can see where this chip would be most helpful," Garvin said. "We'd definitely take a look at it."

New Chip on the Block

IBM says its MXT memory-controller chip can double existing memory on Intel-based PCs. Here's how it works:

- **IBM has developed an algorithm** that caches and compresses information as it passes through a processor chip.
- **The algorithm is embedded** on a new chip, which routes traffic between the processor and memory of the computer.
- **Frequently used data and commands** are kept available for immediate access, while less-frequently used data is compressed and stored in memory rather than on a disk.
- **The new chip can then uncompress** the data from memory.
- **IBM tests have shown** that the new operation will create a maximum overhead of 3% on a given computer.

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—Zona Research, Inc. Q1 2000 eProcurement Study.

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CONTENTS MAY STARTLE THOSE WITH LOWER EXPECTATIONS. USE CAUTION

Kerberos

DEFINITION

Kerberos is a network authentication protocol that allows one computer to prove its identity to another across an insecure network through an exchange of encrypted messages. Once identity is verified, Kerberos provides the two computers with encryption keys for a secure communication session.

BY RUSSELL KAY

KERBEROS WAS developed at MIT in the 1980s. It was named after the three-headed watchdog in classical Greek mythology that guards the gates to Hades.

The name is apt because Kerberos is a three-way process, depending on a third-party service called the Key Distribution Center (KDC) to verify one computer's identity to another and to set up encryption keys for a secure connection between them. (For simplicity's sake, let's call one computer client and the other target server.)

Basically, Kerberos works because each computer shares a secret with the KDC, which has two components: a Kerberos authentication server and a ticket-granting server. If a KDC doesn't know the requested target server, it refers the authentication transaction to another KDC that does.

By exchanging a series of encrypted messages, called tickets, with the client, the KDC generates new encryption keys for each stage of the authentication process. It can successfully verify one computer to the other without compromising either one's secret keys and without requiring either computer to store keys for every computer it might possibly connect to. The tickets are good only for a single specific computer connecting to another specific computer during a designated period of time. (See the diagram at right for more details about how the Kerberos ticketing process works.)

After the ticket is issued, the client can use it to gain access to the target server any number of times until the ticket expires. Neither the client nor anyone snooping around the network can read or modify a ticket without invalidating it.

How Standard a Standard?

The default protocol for network authentication in Microsoft Corp.'s Windows 2000 operating system is Kerberos Version 5. To allow public-key-based authentication [QuickStudy, March 16, 1998] rather than Kerberos' usual password-hash-based secret key, Microsoft chose to add its own extensions, which makes its implementation of Kerberos slightly nonstandard but still allows for authentication with other networks that use Kerberos 5.

Authentication in Windows 2000 is more efficient than in Windows NT because Kerberos eliminates the need in NT for a server to check with a domain controller. ◗

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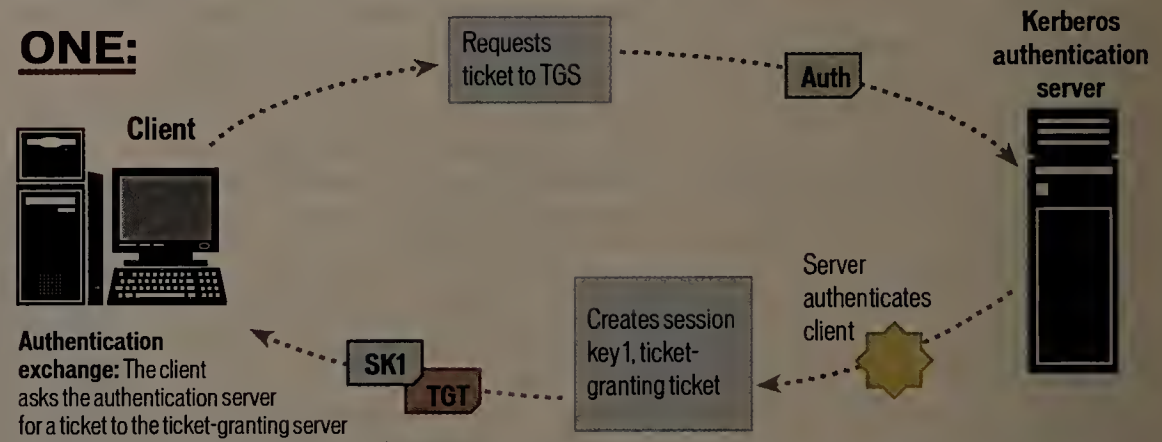
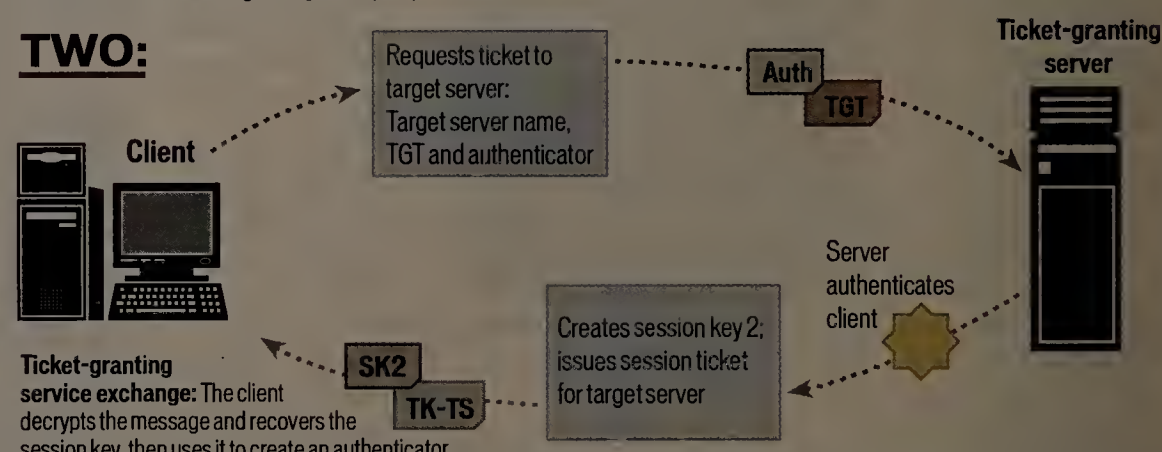
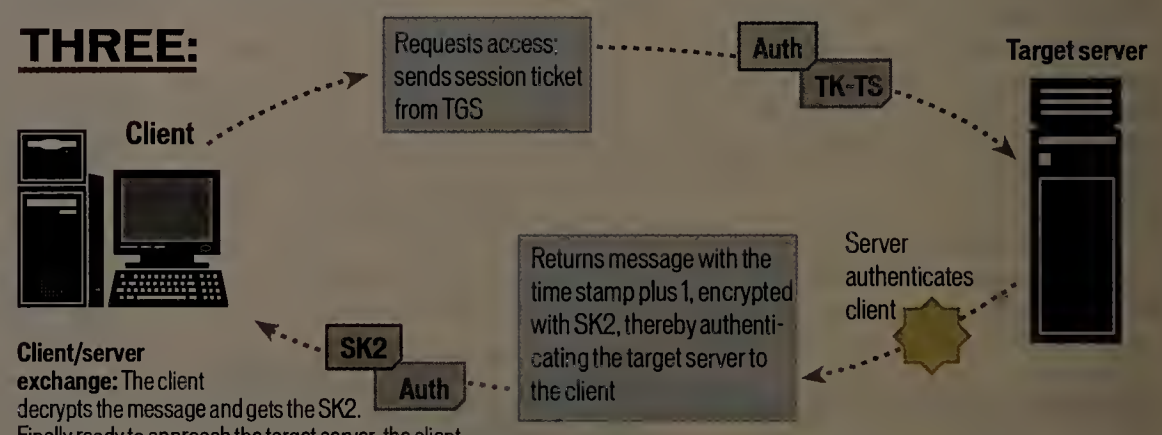
Sharing a Secret: How Kerberos Works



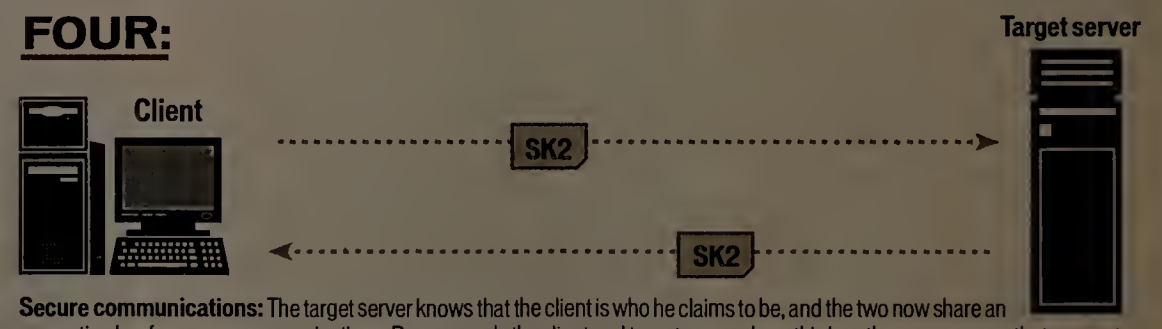
Authentication exchange: The client asks the authentication server for a ticket to the ticket-granting server (TGS). The authentication server looks up the client in its database, then generates a session key (SK1) for use between the client and the TGS. Kerberos encrypts the SK1 using the client's secret key. The authentication server also uses the TGS's secret key (known only to the authentication server and the TGS) to create and send the user a ticket-granting ticket (TGT).



Ticket-granting service exchange: The client decrypts the message and recovers the session key, then uses it to create an authenticator containing the user's name, IP address and a time stamp. The client sends this authenticator, along with the TGT, to the TGS, requesting access to the target server. The TGS decrypts the TGT, then uses the SK1 inside the TGT to decrypt the authenticator. It verifies information in the authenticator, the ticket, the client's network address and the time stamp. If everything matches, it lets the request proceed. Then the TGS creates a new session key (SK2) for the client and target server to use, encrypts it using SK1 and sends it to the client. The TGS also sends a new ticket containing the client's name, network address, a time stamp and an expiration time for the ticket – all encrypted with the target server's secret key – and the name of the server.



Client/server exchange: The client decrypts the message and gets the SK2. Finally ready to approach the target server, the client creates a new authenticator encrypted with SK2. The client sends the session ticket (already encrypted with the target server's secret key) and the encrypted authenticator. Because the authenticator contains plaintext encrypted with SK2, it proves that the client knows the key. The encrypted time stamp prevents an eavesdropper from recording both the ticket and authenticator and replaying them later. The target server decrypts and checks the ticket, authenticator, client address and time stamp. For applications that require two-way authentication, the target server returns a message consisting of the time stamp plus 1, encrypted with SK2. This proves to the client that the server actually knew its own secret key and thus could decrypt the ticket and the authenticator.



Secure communications: The target server knows that the client is who he claims to be, and the two now share an encryption key for secure communications. Because only the client and target server share this key, they can assume that a recent message encrypted in that key originated with the other party.

KEY: Auth Authenticator | SK1 Session key | TGT Ticket

Editor's note: This description was adapted and considerably simplified from *Applied Cryptography: Protocols, Algorithms, and Source Code in C*, 2nd Edition, by Bruce Schneier (Wiley, 1995).

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Supercomputers Make a Comeback

Proving that rumors of their demise were greatly exaggerated, very-high-performance computers show promise as tools to do the heavy lifting for e-commerce applications in mainstream IT shops.

By Gary H. Anthes

It was the early 1990s, and supercomputing was an industry in decline. Its biggest customers — U.S. defense and intelligence agencies — cut back sharply on purchases of the costly behemoths following the end of the Cold War.

Meanwhile, with the speed of commodity microprocessors doubling every 18 months, the performance advantage of the multimillion-dollar, custom-built machines became less and less compelling.

The end seemed finally to come, symbolically at least, in 1996, when supercomputer grand master Seymour Cray died following a car accident. Cray was foremost among a handful of computer geniuses who for decades had designed the world's fastest computers.

But while these events played out on center stage, behind the scenes, nondefense scientific and engineering applications of supercomputing grew as companies learned how to mimic the physical world in digits. The Boeing Co. in Seattle used supercomputers to design its 777 airplane — which has 3 million parts — without relying on physical mock-ups. It was the first plane ever developed that way.

Now, supercomputers are going into mainstream corporate information technology shops, where they are doing the heavy lifting required for such tasks as processing immense and unpredictable Web transaction volumes. In addition, users have discovered that esoteric scientific algorithms can be used to mine huge databases for sales patterns, detect credit-card fraud and measure the risk of complex investment portfolios.

At Charles Schwab & Co., an IBM RS/6000 SP supercomputer with 2,000 processors does the Web serving and some of the back-end processing for all of the brokerage's e-commerce services. Connected by a high-speed switch, the processors can work together at more than a half-trillion operations per second. It's the 19th most powerful computer on the planet, according to a just-published list of the top 500 supercomputers (*www.top500.org*).

The Schwab operating environment is one marked by high transaction volumes, unpredictable demand and the need to execute customer trades and update accounts almost instantly, says Adam Richards, a vice president at the San Francisco-based firm. As many as 95,000 users have been logged onto the Schwab site simultaneously, he says. "These computers were originally designed for large-scale, numerical calculations," Richards says, "but certain things they had to do — in order to make the calculations efficiently and ship results around — became very useful to us."

And Schwab will have to scale up the system even faster as customers move from simple online account inquiry to

SETH AFFOUMADO

ADAM RICHARDS, a vice president at Charles Schwab, needed a supercomputer to accommodate his users

complex financial planning on Schwab systems. Things such as portfolio-risk assessments, which use simulations and complex mathematical calculations, will move from the hands of professional specialists into the hands of everyday Schwab customers, he says.

Infiltrating Corporate IT

Smaby Group Inc., an IT consultancy in Minneapolis, says "complex scalable computing" in commercial settings is growing at 21% per year. The market for these high-performance systems, costing from $100,000 into the millions, was $8.6 billion last year and will be $14.8 billion in 2002.

A decade ago, most supercomputers were at universities and government agencies. Now, more than half of the 500 fastest computers in the world are in corporations, says Jack Dongarra, a computer science professor and supercomputer expert at the University of Tennessee in Knoxville. Dongarra is one of the authors of the biannual top 500 supercomputers list (see chart).

According to Dongarra, supercomputers are growing in power faster than predicted by Moore's Law, which says that the speed of microprocessors will double every 18 months. That's partly because supercomputers are being built with more and more processors. Indeed, he says there are no longer any single-processor systems on his top 500 list.

Additionally, Dongarra says, supercomputers are using better software, including smarter algorithms and better optimizing compilers.

The combination of faster processors, more processors and better software has been boosting supercomputer performance three orders of magnitude every decade. Dongarra points out that in 1980, the fastest computers in the world worked at about 1 million floating-point operations per second (MFLOPS). Ten years later, top speeds were 1,000 times faster — 1 GFLOPS — and today they are 1,000 times faster still — at 1 TFLOPS.

Those spectacular improvements will continue, Dongarra says, so that in 2010, there will be machines running at 1,000 TFLOPS, or 1 petaFLOPS (PFLOPS). Operating at 1 quadrillion computations per second, such a computer could do in one second what it would take the entire population of the U.S. 50 days to do working nonstop with hand calculators.

At least one computer may jump the PFLOPS hurdle five years earlier — for a very specialized application. IBM recently announced it would build Blue Gene, a computing colossus for analyzing the behavior of human proteins. Blue Gene will have 1 million processors — 32 to a chip — able to compute at 1 GFLOPS.

Today, IBM comes in second on the top 500 list with a 5,808-processor behemoth at Lawrence Livermore National Laboratory. With 2.5 terabytes (TB) of memory and 75TB of disk storage, the system simulates the behavior of nuclear weapons at more than 2 TFLOPS. Called ASCI Blue Pacific, it's actually a "constellation" of three RS/6000 SP systems lashed together by a very-high-speed switch. A new supercomputer, ASCI White, will be shipped to the lab later this year and then will be the fastest in the world, IBM says.

ASCI White will use processor chips with copper interconnects and silicon-on-insulator technology, both of which boost performance, says Pete Ungaro, IBM's vice president for scientific and technical computing. Later, IBM will roll out the Power4 chip, a processor with two 64-bit, 1-GHz cores with 100GB/sec. of internal bandwidth.

But advancements in CPU speed aren't enough, Ungaro says. To improve overall system performance, IBM is developing faster ways to communicate among processors, memory and peripheral devices. On the software front, IBM Research is developing more efficient algorithms and faster libraries, he says.

Unfortunately, having more, faster processors doesn't ensure that users get a corresponding boost out of their machines. The biggest supercomputers today often operate at less than 10% of their theoretical maximums because their processors can't be kept busy all the time. That may be because the application software couldn't be or wasn't "parallelized" — structured so that every processor has its own code to run most of the time. Or it may be because of memory latency, which rears its ugly head when processors wait idly for data from memory or, worse, disk.

A solution to the latency problem is to add multiple levels of cache storage on or near the processor chip where commonly used data or instructions can be retrieved very rapidly. Systems today have three levels of cache, but more will be added, Dongarra says.

"We have failed to capitalize on the performance potential of scalable, parallel machines," says Ken Kennedy, director of the Center for High Performance Software at Rice University in Houston. Programmers haven't been good enough at structuring their code for parallel processing and have had difficulty optimizing their code for the complex memory hierarchies in many parallel systems, he says.

Advances to Come

But Kennedy says research shows promise for shifting those burdens from programmers to compilers and other tools. Compilers will produce code that more efficiently uses a processor's cache and local memories and do more global optimization by considering entire programs rather than individual routines, he says. And higher bandwidth inside machines will reduce memory latency, he predicts.

Tera Computer Co. (now Cray Inc., having bought the Cray supercomputer business from Silicon Graphics Inc. in April) devised another solution to the latency problem a decade ago. Called "multithreading," Tera's complex, custom-built processors each contain up to 128 "virtual" processors working in parallel. A 16-processor machine working on 50 instruction threads could execute 800 instructions at once, says Burton Smith, the company's chief scientist.

Processors that share a single, central memory and don't use caches make programming easier because the programmer doesn't have to worry about where data is. And memory latency is almost eliminated because all processors can access any part of memory at full processor speed.

"There have been many bugs in the software," says Wayne Pfeiffer, deputy director of the San Diego Supercomputer Center, and there have been only a few applications in which the Tera/Cray machine outperformed other supercomputers. Still, Pfeiffer says the multithreading concept holds much promise for simplifying programming and boosting performance. ◗

The World's Fastest Supercomputers

RANK	SITE	MAKER	COMPUTER	PERFORMANCE (GFLOPS)	PROCESSORS
1	Sandia National Laboratories	Intel	ASCI Red	2,380	9,632
2	Lawrence Livermore National Laboratory	IBM	ASCI Blue Pacific	2,144	5,808
3	Los Alamos National Laboratory	SGI	ASCI Blue Mountain	1.608	6,144
4	Naval Oceanographic Office	IBM	SP Power 3	1,417	1,336
5	Leiniz-Rechenzentrum (Germany)	Hitachi	SR8000	1,032	112
6	High Energy Accelerator Research Organization (Japan)	Hitachi	SR8000	917	100
7	U.S. government (classified)	Cray	T3E1200	892	1,084
8	U.S. Army High Performance Computing Research Center	Cray	T3E1200	892	1,084
9	University of Tokyo Center	Hitachi	SR8000	874	128
10	U.S. government (classified)	Cray	T3E900	815	1,324

SOURCE: UNIVERSITY OF MANNHEIM, UNIVERSITY OF TENNESSEE

> These computers were originally designed for large-scale, numerical calculations, but certain things they had to do – in order to make the calculations efficiently and ship results around – became very useful to us.
>
> ADAM RICHARDS, VICE PRESIDENT, CHARLES SCHWAB & CO.

As more of the IT universe moves to the Web, search engines are being used to take on increasingly complex business functions. By Lauren John

HOW MANY SEARCH engines do you use? If you're like Paul Gellman, MIS director at Markon Pen and Pencil Inc., a Mineola, N.Y.-based advertising specialty supplier, you use a few to find the inventory you want to buy, a few more to find where to unload excess inventory and a whole lot more for just surfing the Web and finding that perfect low-priced airline fare.

To a seasoned Web surfer, using different search engines for different tasks is easy. "Once you become experienced with searching, the different models are pretty easy to understand," says Gellman.

But try flipping the paradigm — choosing just one search engine to install on your site for customers — and things get a lot harder to understand. Choose carefully: Finding the right search engine to let customers search your online store or to allow employees to unearth best practices on your intranet can mean revenue life or death. Usability researcher Jakob Nielsen, a principal of Silicon Valley's Nielsen Norman Group, reports that more than half of all users are "search dominant": When faced with a choice of using a search box or clicking a link, they use the search box.

The days when sites could rely upon search engines that matched the user's query with every possible response are long gone. Today, users expect not only fast search engines, but also well-ordered results with a lot of context.

The fate of users who trust a corporate or e-commerce site's search technology rests squarely on the shoulders of the information technology department and the Web site's developers — and the technology they choose. There are three options for getting search technology: buying it, building it in-house or outsourcing it. Your choice will depend upon whether the engine is for a business-to-consumer e-commerce site or a corporate intranet.

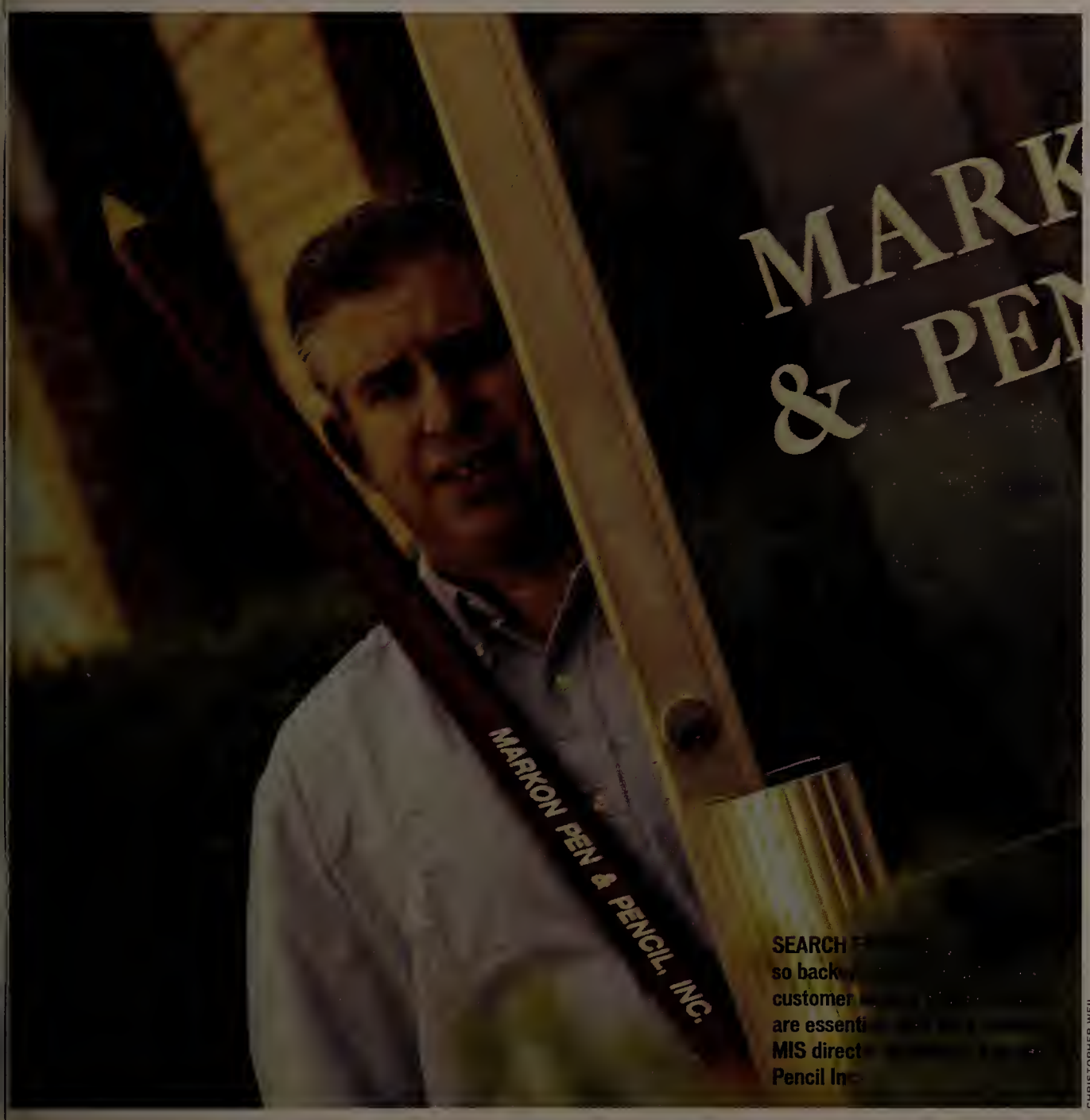
Site Search for Consumers

Search engines on the Web might seem simple: users input a query, the search engine dissects the keywords and checks its databases — mirror copies of every Web page it has ever found — and returns links to the most likely Web pages. But according to a recent NEC Research Institute and Inktomi Corp. research study, there are more than 1 billion indexable pages on the Web today, while current search engines index only about half of them.

Still, that's 500 million Web pages. So using that same search technology to index and retrieve a few thousand products should be easy — right? Unfortunately, searching a site is a different ball game than searching for Web pages. When shopping for products, people aren't willing to churn through dozens

Want

A Search Engine to Pow



CHRISTOPHER WEIL

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of pages of search results. They want accurate, well-presented results, and they want them fast.

And as you add more products, you might need to add more search technology, too. That's what Marc Raygoza, director of Web development at Buy.com Inc. in Aliso Viego, Calif., found: As Buy.com added more kinds of products to its inventory, it also needed to add new search technology to be able to accurately and quickly index them. Buy.com, which opened in November 1997 to sell computers and software, doesn't sell just a few thousand products anymore. It has more than 1.5 million products in an array of categories such as books, videos and software games.

Buy.com was changing the prices on many products and adding inventory daily, and it needed a search engine that wouldn't buckle under the weight of rebuilding its index every night. The company had based its search function on Microsoft SQL Server Version 6.5, which couldn't perform full-text searching or rebuild the index quickly enough.

"SQL Server is a good product, but it just doesn't cut it for millions of SKUs," says Raygoza. "We needed something more robust to do our updating."

So Raygoza went looking for a new search engine, evaluating products such as AltaVista Co.'s Search Engine 3.0 SDK and an array of products and services from Inktomi.

"We took Inktomi out of the running fairly early because their model is basically outsourcing, and we didn't want to outsource the search function completely," says Raygoza.

Buy.com chose AltaVista because its software provided much faster updating than SQL Server and the company had a strong reputation and "fit well into our model of commodity selling," which is based on high turnover of merchandise, says Raygoza.

Update Speed Is Crucial

The key, says Raygoza, is how quickly the search engine rebuilds the search index each night. Buy.com also upgraded to SQL 7 and still uses it for log-in functions. Before it made its final decision, Buy.com tested the updating capacity of the AltaVista software and found it took just 42 minutes to rebuild the entire index, compared with two days for SQL Server, according to Raygoza.

What's more, he adds, the AltaVista engine was already being used by competitors Amazon.com Inc. and Borders Group Inc.'s Borders.com site.

But don't confuse the e-commerce version of AltaVista with its free Web page searching sibling. The core search technology is the same, having been developed on the main site, says Rajiv Parikh, AltaVista's director of product marketing for search and business solutions. But for corporate customers such as Buy.com, AltaVista Search Engine 3.0 adds ranking and relevancy functions that are customized for the business and can be modified as business or market conditions change. AltaVista's corporate search tools also allow users to search other information sources besides the Web, such as their inventory databases, says Parikh.

Staples Inc., meanwhile, was looking for maximum flexibility for the user to go along with search features that could be customized to business needs.

Tom House, project manager of the newly revamped Staples.com Web site, recently put the browser engine idea into practice.

Instead of sticking with search engine technology in which programs look for keywords in Web documents or files, much in the way that a telephone operator uses a name and address to match up to a

Continued on page 58

number, browsers give the user free rein to jump from hyperlink to hyperlink on the Web.

"With over 130,000 different office supplies sold on the site, we had to offer more than just a static list; users needed to be able to drill down into multiple categories," says House. "The time had come for search to meet browser."

The core of the Staples.com search engine is based on Microsoft Site Server search engine technology — in which software is used to build indexes that can support linguistic searches and proximity searches. This is particularly helpful when users don't know the exact names of the products they're looking for. Late last year, an in-house Staples team began building out on that technology — offering site improvements that include a more intuitive navigational framework.

Customers visiting the Staples.com site can search by keyword, item number or brand. When the words *palm pilot* are entered, the site retrieves postings for ballpoint pens and personal digital assistants — but "click-on" headings such as Organizer & Handheld Accessories and Ball Point Stick Pens placed to the right of the product postings link users to appropriate categories.

Intranet Search Lags

Customer goes to site, searches for product, finds it and makes purchase. That's the e-commerce buying cycle. But when it comes to corporate intranets, things get more complicated. For one, most companies haven't invested in decent intranet technology. "Two-thirds of corporate intranets currently aren't searchable in one shot," says Hadley Reynolds, director of research at the Boston office of Delphi Group Ltd. Another problem: Assessing what users need from their intranet isn't as easy as making sure every consumer buys three things.

The promise of corporate intranets is simple: a place for employees to do things such as review best practices gleaned from past projects, make adjustments to their 401(k) plans or check the company stock price or the weather. But the reality is often very distant from that vision. "How do you define the term *corporate intranet*? In the past, engineers used to joke that it was just a Web site like any other — but with a very tight budget," says Ian Hersey, vice president of linguistics products at Inxight Software Inc., a knowledge extraction software company in Palo Alto, Calif.

The mandate now for intranet designers, says Hersey, is to enable people to find content beyond the parts numbers, prices and registration numbers they need to complete sales records.

> **Two-thirds of corporate intranets currently aren't searchable in one shot.**
>
> HADLEY REYNOLDS, DIRECTOR OF RESEARCH, DELPHI GROUP

Prominent Players

Over the past three years, a number of companies have developed or expanded their Internet search offerings to corporate users. Here are some of the prominent or promising players:

ASK JEEVES

Ask Jeeves Inc.'s Ask.com Web site provides Internet links to questions posed to the search engine in the form of standard, conversational sentences. Once a question is posed, the company's proprietary artificial intelligence software breaks down the syntax and meaning of the query and compares the information with other questions in its database. Jeeves then returns the answer, along with results from other search engines.

Corporate Web sites powered by Ask Jeeves – such as those of Microsoft, Nike Inc. and Micron Electronics Inc. – license the "natural language" technology that enables online customers to make inquiries the same way they would in person or over the telephone. In addition to using artificial intelligence technology, Ask Jeeves employs a team of editors and librarians who classify queries and answers. The teams assist in customizing natural-language query technology for companies, enabling them to enter information about their products into the knowledge base.

Searchers are also able to talk to human beings through the Jeeves Live Version 4.0 programs, which enable Web-based customer interaction through real-time, voice- and text-based collaboration between customers and live agents.

Launched in 1997, Ask Jeeves is based in Emeryville, Calif.

INKTOMI

Started in 1996 by a computer science professor and his first graduate student at the University of California at Berkeley, Inktomi is a search engine that focuses exclusively on providing search technology to other sites.

As of May, software produced by Foster City, Calif.-based Inktomi powered more than 80 sites on six continents, performing more than 80 million searches per day, according to company officials.

The Inktomi Search Engine is now used by many of the world's leading search sites, including HotBot, NBC's Snap and Yahoo. In what may be an indication of the future for search engine companies, however, Inktomi and Yahoo Inc. announced last week that they had formed a partnership that will make Inktomi's technology the basis for the Yahoo corporate intranet. At the same time, Santa Clara, Calif.-based Yahoo will phase the Inktomi search engine out of its public search site.

GOOGLE

As Inktomi retires from the Yahoo public site, Google Inc. will move in as the default search provider for Yahoo, according to an announcement by the companies last week. Google claims that its most recently released index, comprising more than 1 billion Web addresses, makes it the largest search engine available today.

Two Ph.D. candidates at Stanford University developed a search engine that uses mathematical algorithms to determine the importance and relevancy of Web pages and then founded Mountain View, Calif.-based Google Inc. in 1998.

Whereas most search engines use a keyword or metasearch technology, Google is hypertext-based – a feature that helps ensure that the most important result comes up first. Google also provides searchers with an excerpt from the Web page with the search terms highlighted in bold type.

XDEX

One newly released search engine system for the corporate intranet market is Columbia, Md.-based Sequoia Software Corp.'s Xdex – a shrink-wrapped XML indexing engine that can catalog XML-based business documents, even when users don't know where the document is stored.

Originally part of a health care software system created to store and index patient information, Xdex uses the hierarchical structure of XML to search for tag and value pairs, enabling users to conduct searches within content context. – *Lauren John*

At the New York law firm Skadden, Arps, Slate, Meagher & Flom LLP, one of the lures of a corporate intranet was that it would allow the firm to search past cases it had handled. The firm needed to find software that could handle large documents, was scalable and was flexible enough to adapt to future needs and be compatible with the technology already in use, according to Charmaine Polvara, knowledge manager at the firm.

Skadden, Arps set up its intranet using the Verity software that came in a package with the ColdFusion intranet server it had selected, says David Hill, systems development manager at Skadden, Arps.

The law firm then chose Verity Inc.'s Information Server, Knowledge Organizer and HTML Export as the knowledge retrieval software underlying its Web-based legal precedents system. This system gives the 1,400 attorneys at Skadden, Arps access to filings, briefings and other documents related to previous case work, says Polvara.

One of the key attractions of the Verity products was their interoperability with the firm's document management system, Hummingbird's PCDocs, says Hill. The system also provides hit-term highlighting in both text documents and Portable Document Format files, a crucial function for lawyers searching for very specific information in briefs that run to many pages, says Hill.

"The system now allows any attorney to browse to any document stored in our databases in any form and then search the document efficiently," says Hill.

Business-to-consumer and intranet search technology, however, isn't always perfect. Accordingly, many companies are providing backups in the event of search failure. "Let's say I'm ordering a printer part at Buy.com," says Gellman at Markon Pen and Pencil. "If it doesn't work, I can call the 800 number, talk to a person and order the stuff." That, he says, is reassuring — and one of the reasons he keeps going back.

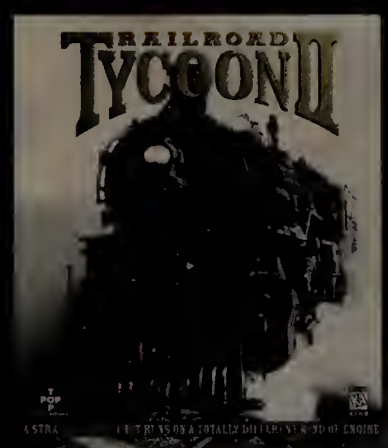
Operators Standing By

Raygoza says Buy.com is supported by an outsourced 400-operator help desk, and the company is working to shift functions from customer service representatives to the Web site.

"It used to be that anything like a request of cancellation involved a phone call, but now we direct people to a place they can do it on the site, and our calls have decreased dramatically," says Rayzoga.

"No matter how good and how user-friendly your search technology and your site are, people are still apprehensive about placing orders on the Web. We can take them to the product with the technology, but it's hard for them to put their trust and their money in a software application. It's changing, but a lot of people still feel better with a human guiding them through difficulties."

John is a freelance writer in Menlo Park, Calif. Staff reporter Mathew Schwartz contributed to this article.



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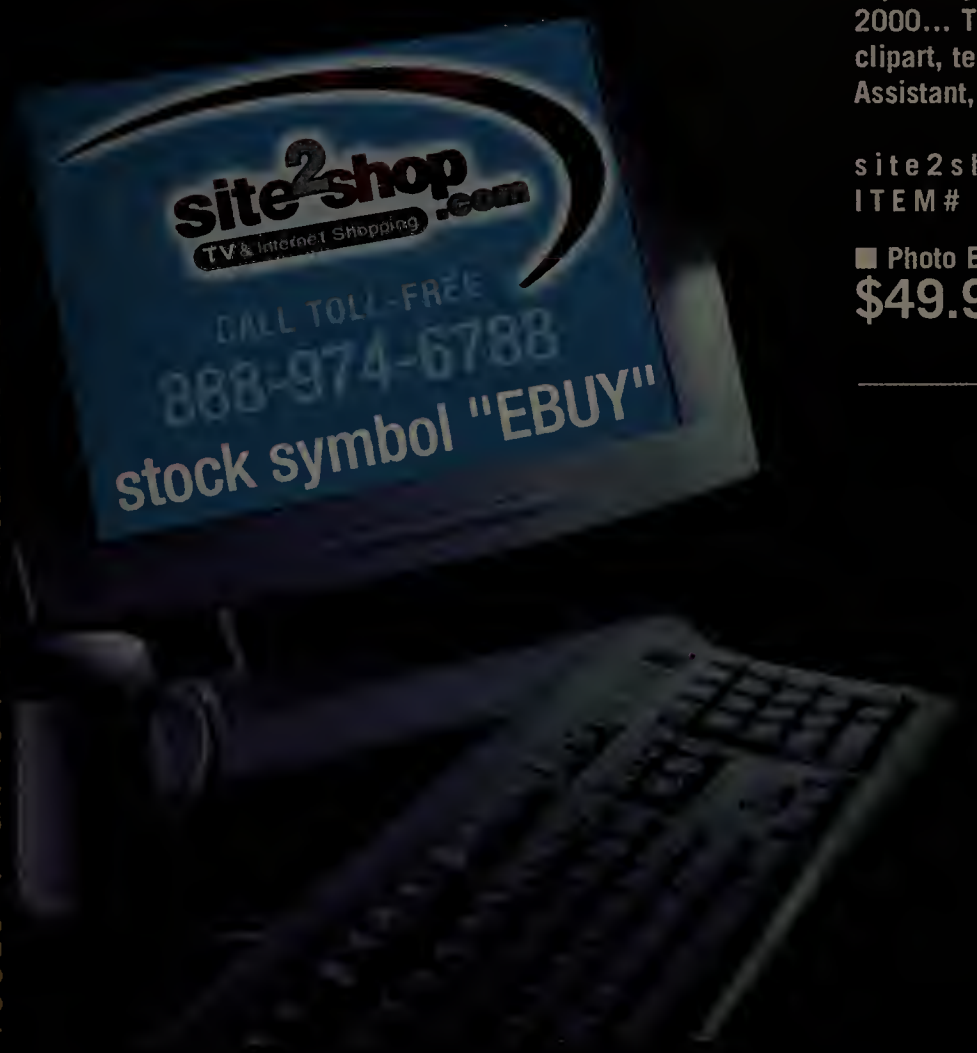


TOOLS I GIFTS I PET PRODUCTS I SPORTING GOODS I COMPUTER SUPPLIES I KIDS STUFF I HEALTH AND BEAUTY I ELECTRONICS

CHEAP SHOTS

These four free Web-based services can deliver cost savings for corporate users. But know the trade-offs first.

By Mathew Schwartz

The drive to get Internet tools for free isn't derived from some evolved sense of household budgeting; it's innate. "It is part of our animal instinct," says Timothy Hoffman, a psychotherapist and the director of Ambrosian Associates in Pastoral Counseling in Spencer, Mass.

It isn't a question of morality, he says. "It's why Eve made that tragic mistake — the apple was hanging around for free. Really, it was just a survival instinct to grab it," he explains.

Far from causing you to be cast out of Eden, the following four free services can serve as useful alternatives to their more expensive counterparts — or they can complement existing information technology services — if you know the risks.

Storage on Demand

It's no secret that most users don't back up their hard drives. But now many users are dumping backups of their important files into free online storage spaces, also known as "virtual hard drives." Companies such as i-drive.com and Driveway Corp., both in San Francisco, offer about 50MB of free storage per user.

"I-drive saved our lives on at least one occasion that I can recall," says Sheryl Worcester, a consultant at The Townsend Group, a small campaign consulting business in Washington. When the disk containing a file for an important presentation couldn't be found, it turned out that someone had also saved the file to an i-drive account. "After that, we began using it very consistently," says Worcester.

Now The Townsend Group uses online storage for backups and file sharing. Co-workers often put the finishing touches on presentations while Worcester is en route to a client. She then uses a computer with Web access at the client's site for the briefing. "It's nice to have everything waiting for you when you get to your destination," she says.

But while any backup regimen is better than none, don't mistake free online storage for secure, reliable backup sites, which can back up and restore a user's desktop, says Philip Mendoza, an analyst at International Data Corp. In Framingham, Mass. "In general, most free sites don't have very good security. If you have stuff you don't want people to see, it should be encrypted before you send it."

Users who pay for dedicated online backup software and servers get greater speed and efficiency for the money.

Fax and Voice Mail

For many world travelers, retrieving corporate voice mail means an expensive call home. Without a computer, you won't get your e-mail, either.

Now "universally accessible unified messaging" — a one-stop service to retrieve voice mail, e-mail and faxes from anywhere, anytime, might change all that. Minneapolis-based U. S. Bancorp Piper Jaffray Inc. predicts that the communications application service provider market will grow from $250 million in 1998 to $7.2 billion in 2003.

"I travel a lot — at least once per week, and often out of the country," says Jan Weiss, a New York-based international investment banker. When she leaves town, she gives her co-workers the fax number to access a free account at Onebox.com, which is owned by Phone.com Inc. in Redwood City, Calif. "Because I'm often in funky places, it can be hard to get faxes in the middle of the night," she says.

Onebox, a free service similar to those offered by Menlo Park, Calif.-based eFax.com Inc. and Los Angeles-

based JFax Communications, gives users phone numbers for incoming faxes and voice mail and an e-mail addresses. Messages show up in the users' online accounts, and users click on them to play voice mail or display faxes. Users can also call in to check voice mail and hear e-mail messages read electronically.

But when security fails, free e-mail can mean free e-mail for all to see. That's exactly what happened last Aug. 31, when hackers exploited a Microsoft Corp. programming error to deactivate the password protection on its free Hotmail Web-based e-mail accounts for 10 hours. More than 40 million accounts were vulnerable.

Security risks aside, the cost is attractive. "For the amount that I use it, it's great," says Weiss, who normally only gets a few faxes per trip.

E-Mail Lists

One of the benefits of the Internet is that it allows people to join communities made up of others with similar interests. Take e-mail lists: Onelist (which later merged with eGroups Inc. in San Francisco) created its first e-mail list to discuss the anole lizard. Anytime someone on the list sent an e-mail to the eGroups e-mail address, every other person who subscribed to the list received that e-mail. A community formed. "People on the list were talking breeding habits, eating habits," says Mark Fletcher, co-founder and chief technology officer at eGroups.

For dispersed organizations, project teams that disband and reform frequently or other networks of people, having users handle their own subscriptions saves IT people from having to administer those accounts.

But the downside of free e-mail lists lies in the administration time, says Beau Gould, CEO of NYC-Search, a one-man recruitment firm in Astoria, N.Y. He also administers the eGroups "nycnmj" e-mail list, to which anyone can subscribe or post New York-area job openings or résumés.

"Sometimes people subscribe to the list and don't realize what they're getting themselves into — the volume of e-mail being sent — and ask to be removed," he says. Users can log on to eGroups and deactivate any subscription, but Gould says about 90% of them either don't know how or don't want to take the time. So they e-mail him or spam the list with "Unsubscribe me!" messages.

Since most e-mail lists archive every e-mail sent to a group, free e-mail lists might not be a good option for companies that need to keep their internal workings secret.

Instant Messaging

While the adoption of corporate instant messaging (IM) — real-time text messaging between computers — has been slow, 46% percent of Fortune 1,000 companies plan to use IM for business collaboration by the end of next year, according to Cambridge, Mass.-based Forrester Research Inc.

For many organizations, free IM just doesn't scale. A new user-name file has to be pushed out to every user every time an employee changes, and someone needs to maintain the file. Commercial IM software, on the other hand, automates this process.

But some companies are turning to free IM software for customer-critical activities such as customer support. "For our support group, we do ad hoc support through ICQ and AOL Instant Messenger," says Fletcher. "Once you have a Web site, you want to keep providing increasing levels of support to users. You want an immediacy to your level of support that instant messaging can give you."

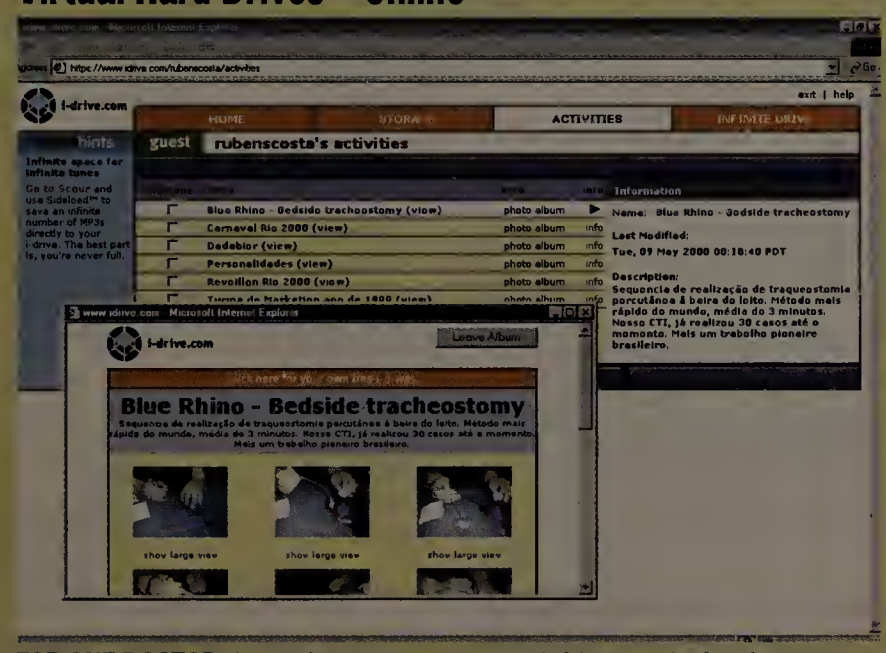
Unfortunately, there's no one standard for instant messaging, and companies such as America Online Inc. often block competing IM software from communicating with theirs. Still, "there's obviously strength in numbers, and ICQ and AOL's IM cover most customers," says Fletcher.

The biggest beneficiaries of free Internet tools might be road warriors — travelers who use the tools to supplement their existing IT travel arsenals.

E-Mail Lists: Inexpensive Collaboration

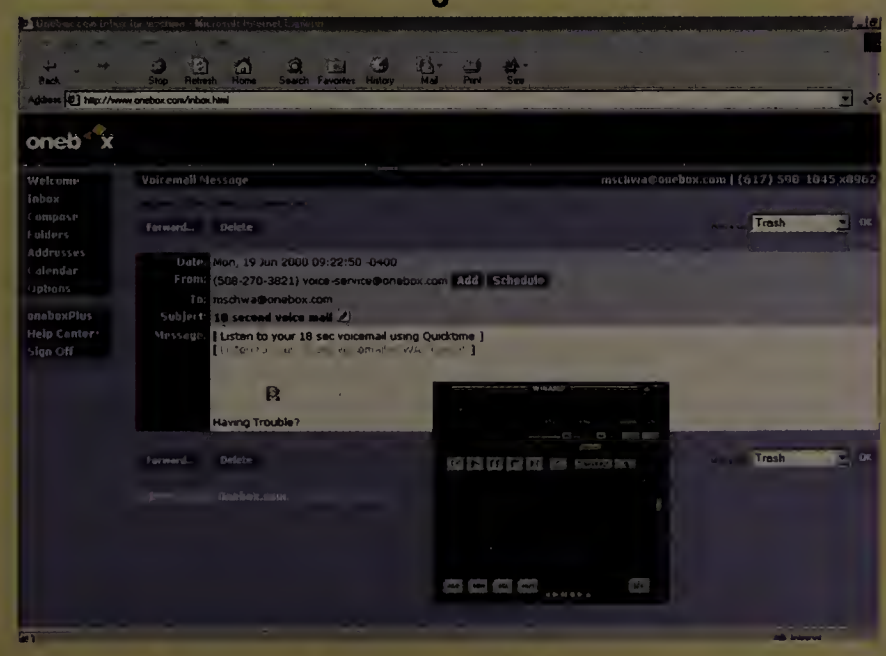
ONE E-MAIL ADDRESS, many recipients. Users can opt into or out of lists on their own, which, in theory, saves administration time

Virtual Hard Drives – Online



FOR ONE DOCTOR, free online storage space at i-drive.com is the place to share notes and images with other tracheostomy researchers

Retrieve Voice Mail Through Your Browser



ONEBOX.COM GIVES USERS a free phone number for receiving faxes and voice mail. Users can listen to voice mail from their browsers

NO FREE LUNCH

"There's no such thing as free e-mail, or free lunch," says Timothy Hoffman, psychotherapist and director of Ambrosian Associates in Pastoral Counseling. Using something that has no cost attached to it carries a different type of risk – it circumvents humans' innate sense of value. "Free also means addiction. I see a lot of people who are addicted to AOL chat rooms," says Hoffman.

But don't despair about the human condition too quickly; there are limits to what many people will do for a free lunch. For instance, in a research study conducted last November, Jupiter Communications Inc. in New York found that 23% of consumers said they would be interested in free online access in return for viewing advertising and letting their buying patterns be tracked. But 16% said they would rather pay $5 per month to their Internet service provider in exchange for not viewing advertising.

Jupiter recommends that users evaluate free services according to four criteria: level of privacy, length of commitment required, intrusiveness (such as losing screen real estate to advertising) and amount of options (such as having more than one PC available in a free PC offer).

For corporate users who need the added features of a paid service, Jupiter recommends using the free services as a backup. For example, if corporate e-mail goes down but there's Web access, employees could still use Web-based e-mail accounts to get work done. – *Mathew Schwartz*

Bringing Harmony To Disk Storage

DataCore's SANsymphony server software blends existing disk storage devices

BY AMY HELEN JOHNSON

SIX MONTHS AGO, Dick Boyle, vice president of The Chase Manhattan Bank's global private banking division in New York, decided to consolidate his 54 Notes and NetWare servers down to eight machines. That meant he had to make a few decisions, most notably how to distribute 3 terabytes of data so users could access it quickly and the information technology staff could administer it easily.

Boyle decided on a storage-area network (SAN) architecture, which provides access to the physical disk space on any machine from all other machines in the storage network.

But instead of buying an expensive hardware and software combination from a storage system vendor like EMC Corp. in Hopkinton, Mass., Boyle opted for a Fibre Channel switch from Gadzoox Networks Inc. in San Jose, with Fort Lauderdale, Fla.-based DataCore Software Corp.'s SANsymphony Server Edition software running on a Windows NT Server.

The combination of these two products, says Boyle, provides a simple storage infrastructure that cost him only $210,000, including hardware, and gave his staff an operations application that was well designed for the job.

"I can sleep well at night knowing I only invested $210,000 rather than $1 million," he says.

Music to Their Ears

Low cost is a key part of SANsymphony's appeal, says DataCore co-founder Ziya Aral, the company's chairman and chief technology officer.

"Like everything else in the industry, storage is going to commodity hardware," Aral says. SANsymphony is a software tool that provides most of the features and functions of proprietary disk controllers, he says. Because it works with any brand of disk storage device, it lets corporations use their existing hardware assets.

"SANsymphony is a sophisticated attempt to get around the insular nature of storage," says Dan Tanner, an analyst at Boston-based consultancy Aberdeen Group Inc. "It lets the enterprise treat all of its storage as one resource."

An IT shop, Tanner says, will find a big advantage in using SANsymphony's drag-and-drop interface to administer the network. Boyle says he agrees. "I give DataCore a lot of credit for understanding what the operations side needs to see to put it all together," Boyle says.

There was a learning curve, but Boyle says he attributes that more to his staff's need to grasp the new paradigm of virtualized storage than to any flaws with SANsymphony's user interface.

He says he praises the mapping diagrams for being clear and easy to read and for mimicking the graphics of familiar network management tools.

One other significant benefit of SANsymphony, says David Hill, an analyst at Aberdeen Group, is that the software works in heterogeneous environments.

Many times, says Hill, a SAN tool is bundled with a particular brand of storage, which usually means that it works with only one network operating system. But SANsymphony supports a number of network operating systems so that the storage devices can run on Windows NT, Windows 2000, NetWare or Unix (including Solaris, AIX, HP-UX and Linux) systems. "Most companies have a mix of Unix and NT servers, and they want to be able to mix those," he says.

Fine Tuning in Order

Kelly Overgaard, network services manager at Adaptec Inc. in Milpitas, Calif., says he likes the free weekends SANsymphony promises him.

Overgaard has been running a pilot project with SANsymphony since last November. He's waiting for the final release of the Network Edition, which runs on multiple machines for system fail-over capabilities, before moving forward on his SAN project. With a product like SANsymphony running in a mirror configuration, Overgaard says, his staff can add new disks and reallocate space and users while the system is running.

That means no more coming in on Saturdays — which he does about every three months to take down the storage servers and do paperwork.

One thing Overgaard says he's not happy with, however, is the price. The Network Edition lists for $14,995. A more reasonable price would be about $5,000, he says.

Note: DataCore last week announced the acquisition of Demand Technology Software in Fort Lauderdale, Fla., a vendor of performance-monitoring software that has storage management expertise. ◗

Johnson is a Computerworld *contributing writer in Seattle.*

ANDREW ITKOFF/SILVER IMAGE

DATACORE CO-FOUNDERS George Teixeira (left) and Ziya Aral say SANsymphony's advantage lies in its platform independence

DataCore Software Corp.

COMPUTERWORLD emerging companies

Location: 6261 N.W. 6th Way, No. 110, Fort Lauderdale, Fla. 33309

Telephone: (954) 267-1620

Web: *www.datacoresoftware.com*

Niche: SAN management software

Why it's worth watching: Its software tool turns existing storage attached to Unix, Windows NT or NetWare servers into a SAN.

Company officers:
- Ziya Aral, co-founder, chairman and chief technology officer
- George S. Teixeira, co-founder, president and CEO

Milestones:
- 1998: Founded
- May '00: Server edition released
- June: Network edition released

Employees: 120; annual growth of 300% projected

Burn money: $45 million from Van Wagoner Capital Management Inc., New Enterprise Associates, OneLiberty Ventures and private investors; $40 million round under way

Products/pricing:
SANsymphony Server Edition, $7,995
SANsymphony Network Edition, $14,995

Customers: The Chase Manhattan Bank, Adaptec Inc.

Partners: Gadzoox Networks , Nissho Electronics Corp., Gain Systems Inc., ITIS Services LLC

Red flags for IT:
- Industry heavyweights, including Compaq Computer Corp. and EMC Corp., have competing offerings
- Requests for data must go through the SANsymphony server, a potential bottleneck for a high-performance data sets, like transaction processing systems.

[the buzz] STATE OF THE MARKET

What's in Storage?

DataCore is unusual in that it offers only the software piece of a storage-area network (SAN). Most SAN vendors supply the software, controllers and disk hardware as one package. The big storage server companies are the same ones you probably buy your workstations from – Dell Computer Corp., Compaq Computer Corp. and IBM. And there are a few companies that specialize just in storage, such as EMC Corp. and Seagate Technology Inc. in Scotts Valley, Calif.

EMC Corp.

Hopkinton, Mass.
www.emc.com
EMC's Enterprise Storage Network is a comprehensive package, and most prospective SANsymphony users will probably consider using it. EMC is the leader in this type of integrated storage niche, supporting multiple operating systems – Unix, Windows NT, Windows 2000 and Linux – and multiple communications technologies such as Fibre Channel, SCSI and Escon.

The company provides all the pieces: the file servers, the communications hardware and the management software. That approach can be expensive; a seven-figure sale is not at all unusual.

XIOtech Corp.

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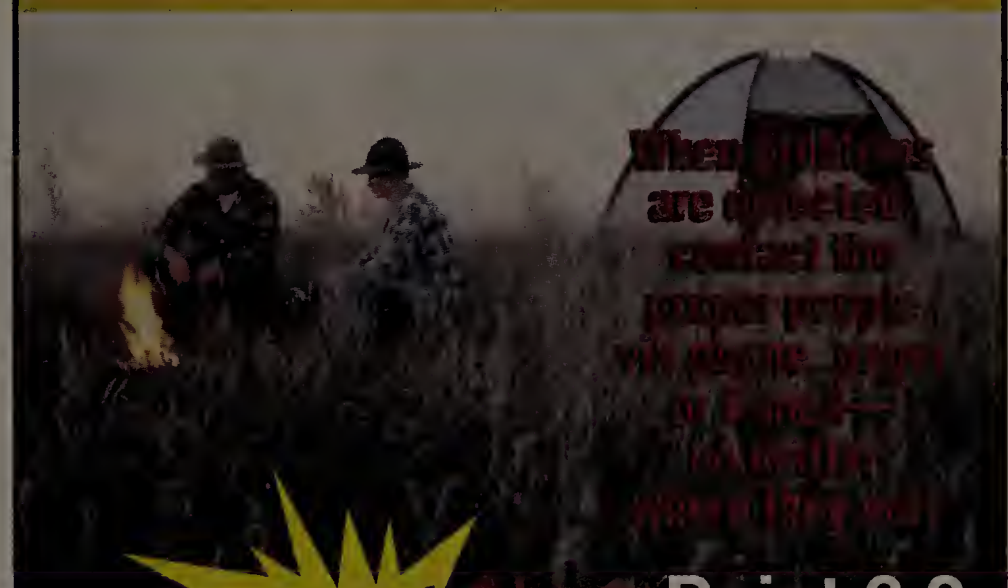

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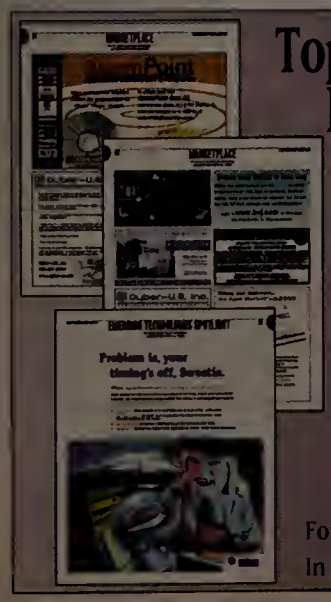

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CHRIS HARTLOVE

Incubator Hatchling

For ambitious IT students with big dreams of starting their own companies, college incubators are providing that set of wings. By Bronwyn Fryer

WITHOUT THE resources to get goods and services to market, even the most innovative start-ups can miss the boat.

By bringing different start-ups together into large complexes with resources such as research labs, T1-wired office space and secretarial pools, business incubators lower costs and increase the survival rates of new companies. They also provide the contacts and business know-how that are vital for start-ups to seize opportunities in a world where time is of the essence.

Among those jumping on the incubator bandwagon are an increasing number of universities. The transfer of technology from campuses to companies can yield lucrative intellectual property rights for universities, while also helping local economies, providing more jobs for graduates and generating tax revenue.

For students, there's an added bonus: the opportunity to get hands-on training in the high-tech industry while earning a degree. Here's one young student who went even further, using the incubator at his university to start a company of his own.

Andy Lufburrow
CEO
Digimo.com
Baltimore

If anyone is young and restless, it's 19-year-old Andy Lufburrow. Before he even graduated from high school, Lufburrow had already started a small systems integration company. So when he was looking for a college, his attitude was "What can you do for me?"

He found what he wanted at the University of Maryland, Baltimore County (UMBC). Not only does the school have a strong computer science and engineering program, but its technology center also includes an incubator for high-tech businesses.

That made UMBC an exciting environment for Lufburrow, an up-and-coming entrepreneur who didn't want to put his business ideas on hold while he pursued his education.

Digimo, which Lufburrow started at the incubator, is half Web development company, half training business. Students who train in Internet applications at Digimo hook up with employers after they graduate.

"We know that students will be hot for jobs while they are in school," says Lufburrow. Through Digimo, he says, they can "get that real-world experience but not have to drop out." The companies that patronize Digimo not only get top-notch Web design, but they also gain access to a talented pool of potential employees.

When Lufburrow first set up shop at UMBC's incubator, the business was "just myself and an office," he says. At $5 per square foot, space is already a bargain; an additional 50% off the regular rate gave Lufburrow a serious leg up. And because Digicom's headquarters are on campus, he and his employees, who are also students, can easily shift between work and school.

Though he came to UMBC with some business experience, it wasn't until the incubator's board of advisers got involved that Lufburrow's company found its direction. Those mentors showed him that the real value-added part of the company lay in its use of student labor.

"We're still a Web development house," he says, "but we also have a long-term objective for clients because we can give them a future workforce." Now, legal advisers at the incubator are coaching Digimo as it seeks its first $1 million in venture capital.

A network of contacts was perhaps the most important thing the incubator provided, says Lufburrow. He was able to spread the word about his new company through events sponsored by the Greater Baltimore Technology Council, with which the incubator works closely.

More recently, advisers have been "door openers" who "bring people to the table," especially in attracting venture capital, says Lufburrow.

He says he plans to carry his new business relationships into the future. "People that are loyal to what I'm doing — that's the most important thing," he says. "That's going to help you define your next venture."

With all the potential for profit, does Lufburrow ever think of dropping out of school?

"It's not even an option," he says. Though juggling his responsibilities can be a challenge, he adds, he realizes the value of getting an education and knows that his experience at the incubator will only bring more opportunities in the future.

"This will allow me to write my own ticket," Lufburrow says, imagining ventures to come. "It won't be a relearning process. I'll know the steps to get started right off the bat."

Fryer is a freelance writer in Santa Cruz, Calif.

Just the Facts

Name and job title: Andy Lufburrow, CEO
Company and location: Digimo, at the UMBC Technology Center in Baltimore
What he does: Provides both Web design and a pool of future employees to 20 clients, ranging from mom-and-pop businesses to Comcast Corp. in Philadelphia.
How he got the job: Lufburrow successfully started a systems integration and consulting business in high school. By the time he was a senior, Lufburrow was raking in $130,000 annually.
Skills required: "Drive, passion and a demonstrated ability to work hard," says Lufburrow. He had to present a business plan for his technology-focused business, outlining how the company would differentiate itself from other Web development businesses.
Training needed: Lufburrow, who began programming in GW-Basic at the age of 7, was already familiar with C, C++, Unix, HTML, Visual Basic and various database programs.
Salary potential: Digimo is pursuing a first venture round of up to $1 million; if the company is successful, Lufburrow's salary could qualify him for retirement at the age of 30.
Career path: Once he graduates, Lufburrow says, "I will definitely be a serial entrepreneur. This isn't my last idea."
Advice: "Whatever you do, do it well – and stay focused."

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Software Engineer-Networking: Analyze & define end-user reqrmts for systm in communication & networking areas; formulate applic dsgn using object oriented analysis & dsgn techniques, client Server & RDBMS technologies; dsgn & implmnt system using C++, TCP/IP, Oracle; deploy dsgn on operating system such as UNIX & MS-Win NT; document dsgn; & train end-users of the applic. Reqmts: Masters in CS, E or related or equiv. Also req knowl in Object Oriented Methodologies for analysis, dsgn, & prgmg using C++, TCP/IP, & Oracle; knowl of using sockets; knowl of networking (LAN's & WAN's); knowl of network protocols, Including TCP/IP & SNMP; knowl of network devices, including routers, bridges, & hubs; must possess and understanding of organizations & information systems. No work exp req. 8a-5p. 40 hrs/wk. $73,000/yr. Submit 2 resumes to Case #19992448 PO Box 8968, Boston, MA 02114.

SYSTEMS ANALYST Position is located in Miami, FL. Will be responsible for Human Resource support in IT. Analyze requirements and design/develop automated solutions. Gain acceptance of designed solution. Ensure appropriate system testing is performed against the design agreed to. Manage deviations and additions to the design as they arise through development process. Implement timeline and ship schedule for onboard crew members. REQUIREMENTS: Bachelor's degree in Engineering. Two years of experience as a Systems Analyst or two years as a Programmer Analyst. 40 hours per week; 9:00am-5:00pm, $67,500 per year. Send resume to Dept. of Labor/Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, Fl, 32302-0869. RE: JO#FL-2086533.

Senior Software Engineer: Software conversion regarding year 2000 issues analyzing large code bases written in various languages, modifying proprietary software tools to aid in the identification and remediation of Y2K problems, correcting Y2K problems, and conducting tests to ensure that the systems meet their intended functionality. Requires: B.S. in C.S., Math or related field and 5 years experience in software development. Knowledge of C, COBOL, PL/I, Visual Basic, Oracle, Sybase, SQL Server, MVS, UNIX and Windows NT. 40 hrs/wk (9 to 5); $72,500/yr. Send two resumes/response to Case # 19991458, Box 8968, Boston, MA 02114.

Senior Software Engineer - Design, develop and test telecommunications applications on enhanced service platforms utilizing C and C++ programming languages. Requirements include a Master of Science Degree in Computer Science or related field and three years of pre-or post-degree experience in UNIX utilizing C/C++ and object-oriented design. Experience must include the use of SS7 signaling protocols and wireless network protocols. Applicants must have unrestricted authorization to work in the United States. Salary $79,000/year. 40 hours/wk. Respond with two copies of resume to Case #19992571, P.O. Box 8968, Boston, MA 02114.

SYSTEMS ANALYST. Analyzes user requirements, procedures and problems to automate processing or to improve existing computer system. Bachelor of Science degree in computer science, engineering, or math-related and two years' experience in job offered required. Must be able to travel. Two years' experience required using Visual Basic, Oracle in designing and development computer systems. $62,920 / yr.

Interested applicants apply by sending two resumes to Georgia Department of Labor, Job Order No: GA 652 1877; 2943 North Druid Hills Road, Atlanta, GA 30329-3909 or to the nearest Department Of Labor Field Service Office.

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IT careers.com

Where the best get better

Programmer/Analyst wanted by New Jersey S/ware Dvlpmt Co. for job in Ridgefield. Must have Bach in CS, Engg. Math, Physics & 2 yrs s/ware experience.

Respond to: HR Dept., Sungard Trading Systems, 1008 Virgil Ave, Ridgefield, NJ 07057.

Systems Administrator, Lowell, MA; Integrate Unix Systems with Filenet Document Imaging software. Design and develop software using PERL, UNIX Shell and C to automate administrative and reporting jobs. Provide technical support. Req'd. Bachelors in Engg or Comp. Scie. or Math. 2 yrs. exp in job offered or 2 yrs. exp. in computer related profession. 40 hrs/wk., 9a-6p. Mon-Fri. $65,000/Yr. Applicants should submit two (2) copies of resume in response to Case #20000445, P.O. Box 8968, Boston, MA 02114.

Engineers/Programmers/ Consultants needed. Several senior and entry level positions available for qualified candidates possessing MS/BS or equivalent and relevant work experience. Work with some of the following: OS/390, COBOL, IMS, DB/DC, DB2, TELON, ENDEAVOR, VSAM, and X P E D I T O R .

Fax resume to HR Dept. 850-877-0315.

Fulltime Engineering Manager responsible for managing a group of engineers developing Diagnostic Software. Must have Bachelor's in EE or foreign degree equivalent. Must have 3 yrs exp. Salary $75,000/yr.

Send resume to: Nanda Chheda, American Mergatrends, Inc. 6145-F Northbelt Parkway, Norcross, Ga. 30071

Full-time Sr. Programmer Analyst, Programmer Analyst and Sr. Programmers needed. Requirements vary. Please send resume to DataScan Technologies Inc., 1105 Sanctuary Parkway, Suite 190, Alpharetta, Georgia 30004, attn: Michelle Eck.

Systems Administrator wanted by Norwood, MA Co. providing technical solutions for s/ware industry. Must have BS in Electrical Engg & 1 yr UNIX experience.

Respond by resume to: Manoj Saxena, HR Dept., ADZAP, Inc., 210 Neponset St, Norwood, MA 02062.

Programmer/Analyst wanted by Computer Systems Developer in Kent, CT. Must have 2 yrs exp dvlpg comp systems & prgms in accordance w/user needs, systm reqmts & budget and dsgng & implmtg systms. Bach in Comp Sci or Electronics Engg req'd. Respond by resume to: R.D. PO Box 4241 GCS, N.Y 10163.

AS/400 RPG Programmer. (Multiple Openings) Convert data from project specifications and statements of problems and procedures to create or modify comp. programs. Analyze feasibility of conversion and design as well as software and hardware rqmts. Software design and development in internet environment. Tools used are AS/400 and RPG programming. Resumes: Marv Smith, Computer Solutions, Inc. 6187 NW 167th St., Ste H33, Miami, FL 33015. NO CALLS.

Programmer Analyst. $60Kyr. 8a-5p. 40 hrs/wk. Analysis, dsgn, dvlpmt & prgmg in GIS (AM/FM) area using C, C++, MFC, OLE, VC++, MDL, Microstation FRAMME, Advance Java, Oracle, CLIPPER, UNIX, WinNT. Bach or equiv in Comp Sci or related field of Engg. 1 yr exp in job offd. Job loc: Norcross, GA. Mail resume w/r# Chart004 to: Devender Reddy, VP, Charter Professional Services, Inc., 7001 Peachtree Industrial Blvd., Ste 405, Norcross, GA 30092.

Programmer/Analyst: Using IBM 3090 Mainframe computer and software such as COBOL 370, DB2, IMS, JCL, FILEAID, CHANGEMAN, INFOMAN, MSWORD, AND EXCEL, plan develop, test, implement support programs & systems for different business applic at client sites. Possible transfer to Tampa, FL or Jacksonville, FL. Requires BS in Computer Sciences, Min. 2 yr. exp. in job offered; Job located in Miramar, FL; $38.50 per hour; 40 hr wk; 8:00am-5:00pm; Send resume to Dept of Labor/Bureau of Workforce Program Supp, P.O. Box 10869, Tallahassee, FL 32302-0869. RE: JOFL#2091270

Programmer Analyst needed for NJ based company: Req. Bachelors in CS, Eng, MIS or eqv. with 1 year experience on the job or as Systems Analyst.

Various skills combinations required: Sybase, Powerbuilder, MS-SOL, Oracle, Visual C++, Windows NT etc. Apply with two copies of resume to H.R. Department, MD Distributors, Inc, 3 Taylor Road, Edison, NJ 08817.

Systems Engineer for Hollywood, FL to operate Windows NT Servers, provide software/hardware support for user workstations, operate/support accounts payable and passenger manifest system, diagnose, repair circuit boards, design and maintain Company Web Site. Good salary/benefits. Fulltime M-F. Applicants with Bachelor's degree in Comp-Engg., and Microsoft professional certification with 3 years related experience, send resumes only to Maria Lewing, Vice President of IT, Commodore Cruise Lines, 4000 Hollywood Blvd., Suite 385, S. Tower, Hollywood, Florida 33021.

Software Engineer, Lowell, MA; Analyze, design & develop software applications using Informix tools on Unix platform and develop scripts using Unix tools (AWK & Perl). Req'd. Bachelors in Comp. Sci. or Math or Engg. 2 yrs. exp in job offered or 2 yrs. exp. in computer related profession. 40 hrs/wk., 9a.6p. Mon-Fri. $70,000/Yr. Applicants should submit two (2) copies of resume in response to Case #20000456, P.O. Box 8968, Boston, MA 02114.

Systems Analyst wanted by New Jersey based IS/IT Consulting Services Firm for job locs throughout US. Must have Bach in Comp Sci, Engg & 2 yrs s/ware exp.

Respond to: HR Dept, AVS Systems, Inc., 40 Enterprise Avenue, Secaucus, NJ 07094.

Software Engineer wanted by Massachusetts based Internet Software Development Co. Will work at job sites as assigned by employer. Must have Bach in Comp Sci or related field & 1 yr s/ware exp.

Respond to: HR Dept, Trivum, Inc., 398 Columbus Ave, Boston, MA 02116.

Software Development Consultant sought by Waltham, MA Co. involved in corporate placement of professionals. Must have BS in Applied Math & 1 yr exp in distributed databases.

Respond to: M.D. Newhall, HR Dept., InfoTech Contract Services, Inc., 400-1 Totten Pond Rd, Waltham, MA 02451.

System Analyst wanted by Network Systems Consulting Co. in New York City. Must have Bach in Comp Sci, Engg or related science major & 6 months n/work admin experience.

Respond by resume to: HR Dept., TCY Technologies, 36 E. 23rd St, 4th Fl, NY, NY 10010.

Senior Web Developers (Boston Area): leading roles in Web site developing, operating and maintaining. Need life-cycle project experience and will mentor junior developers. Knowledge of C++, Java, VB, ASP, COM,SOL Server required. MS in CS or IT. $75k-85k/year plus benefit.

Send resume to Steve Odio, Rentmaker, Inc., 75 North Beacon St., Watertown, MA 02472, or email sodio@rentmaker.com

Software developer wanted by Software Consulting Co. in Princeton, NJ to support Billing application using Informix 4 GL, ESOL and C in HP-Unix, Sun Solaris and Windows NT environment. Must have BS in Engg/Comp.Sci/Math & 3 yrs s/ware experience.

Respond by resume to: HR Dept, Princetec Inc., 4365 RT 1, Princeton, NJ 08540. Ref# 2000-M

Software Engineer wanted by S/ware Dvlpmt & Computer Consulting Co. for various job locs in NJ & US. Must have Masters in Comp Sci/Engg/Math & at least 3 months computer experience.

Respond by resume to: HR Dept., Xybion Corporation, 240 Cedar Knolls Rd, Cedar Knolls, NJ 07927.

Software Engineer, Lowell, MA; Analyze, design, develop and test applications using Object Oriented technologies with Visual C++, COM and Visual Basic on Windows NT platforms. Provide technical support. Req'd. Bachelors in Math or Comp. Scie. or Engg. 2 yrs. exp in job offered or 2 yrs. exp. in computer related profession. 40 hrs/wk., 9a-6p. Mon-Fri. $70,000/Yr. Applicants should submit two (2) copies of resume in response to Case #20000446, P.O. Box 8968, Boston, MA 02114.

SOFTWARE ENGINEER -New York- Develop Data Warehouse Product using WINGS for use at new branches of our int'l bank. Implement & upgrade software for access over the Internet. Develop, customize & test system. Req's Master's degree in Computer Science, Engineering, Mathematics or a related discipline & experience. Please forward your resume (no calls) to: Credit Agricole Indosuez, Attn:HR/SE Position, 666 Third Ave., NY, NY 10017.

Systems Analyst in a consulting environment w/expertise in AS/400 & web development.

Contact HR, LANSA (630) 472-1004 or visit our web site www.lansa.com

Senior System Administrator: Major international filtration firm seeks Sr. Sys. Admin to design, contigure, install and maintain enterprise-wide computer systems for central and remote Unix, NT, and SUN servers; manage disks and logical volumes for large scale disk systems; analyze hw/sw utilization; upgrade and configure operating system, and do performance tuning. Requires 5 yrs exp. Sys. Admin. in Unix env, adv'd knowledge large scale disk management, expertise w design, installation and performance of enterprise-wide computer systems. Significant on-call for 7/24 Corp Data Center. Apply to: Paul Cavicchi, Millipore Corporation, 80 Ashby Road, Bedford, MA 01730.

PROGRAMMER ANALYST: Plans, develops, tests and documents computer programs; applying knowledge of programming techniques and computer systems.
Bachelor of Science degree in Computer Science, Engineering or Math-related and two year's experience in job offered. Must be able to travel. Two years experience required using PowerBuilder 3.0/4.0 and Sybase System 10. $62,920/year.
Interested applicants apply by sending two resumes to Georgia Department of Labor, Job Order No.: GA 652 1368; 2943 North Druid Hills Rd., Atlanta, GA 30329-3909 or to the nearest Department of Labor Field Service Office.

Multiple positions for IT prof'ls w/NJ based IT firm as following:

Software Engineers: Masters in CS, Eng, Math, MS or eqv. w/2 yr exp as Software Engr or as Programmer Analyst; Bach in CS, Eng, Math, MS or eqv. w/5 yrs Progressive exp as Soft Eng'r or as Programmer Analyst.

Programmer Analyst: Bach in CS, Eng, Math, MS or eqv. w/1 yr exp on the job or as Systems Analyst.

Various skills combos reqd: Sybase, Powerbuilder, MS-SOL, Oracle, Visual C++, Win NT etc. Apply w/2 copies of resume to HR Dept, Vision Systems Group, Inc, d/b/a Vision Consulting Group, Court Towers 39 Hudson St, 3rd Fl, Hackensack, NJ 07601.

Multiple Openings - Prog/Sys Analysts, DBA's, S/W Engineers and Project Managers to design/ develop s/w application using some of the following- Cobol, CICS, DB2, VSAM, JCL; Java, PowerBuilder, HTML, VBScript, XML, Web technologies; Oracle, Developer 2000, PL/SOL, Pro*C; VB, SOL Server, ASP, Perl; C, C++, Rational Rose, Rogue-wave; Oracle/Sybase/Informix database admin.; Unix/NT system admin. - Some positions require an MS or equiv. in CS, Engg, Math, Business Admin or related field and some require BS or equiv. in any of the above. Salary $60 -$90K/yr, full time. Contact: HR, Salem Associates, Inc, 57 North Street, Suite 206, Danbury, CT - 06811.

Strata Solutions Inc. seeking software developers for high-end commercial and operations software with experience including several of the following: Oracle, Sybase, Informix, SOL Server, C, C++, VB, PB, ASP, HTML, MRP,ERP,CIMPLICITY, Mainframe technologies. Please submit resumes to resumes @stratasolutions.com or fax to 336-834-8750.

Quality Assurance Consultant: Perform software quality assurance testing activities by reviewing software requirements and writing detailed test plans. Set up test bed and perform system-testing. Perform software quality assurance using automated testing tools with QA Partner on Software applications (client-server) using Sybase & Oracle. Requirements: Bachelor's Degree in Comptr. Sci. Info. Tech., Engmg., or related. One year related occupation experience must include software quality assurance testing using manual and automated testing tools including QA partner. Salary: $40,996.80, 8am-5pm, 40 hrs./wk. M-F. Applicants should respond to Case # 19992475, PO Box 8968, Boston, MA 02114. Applicants should submit two copies of his/her resume in response.

Software Technical Services, Inc, Alpharetta, GA has immed multiple openings for exp'ed Prog/Sys/Analysts, S/W Engineers, DBAs in the following areas: AS/400, Mainframes, COBOL, Oracle, Oracle Financials, Visual Basic, Visual C++, Sybase, Java, HTML, PERL CGI, web technologies, PeopleSoft, SAP etc. Some positions require MS or equiv. in Engg/ Comp Sci/Bus Adm./Math and some require BS or equiv. in any of the above. Salary commensurate with experience. Foreign equiv. of education and/or combination of exp. and edu. will be accepted. Travel/relocation required. Resumes to. HR Dept, 105 Nobel Ct, Windward Business Ctr N, Alpharetta, GA 30005.

SOFTWARE ENGINEER: Experience in IDMS database methodology; Experience in tools Office 97 and REFLOW: Demonstrated ability to work with Cobol 85, IOS under GCOS-7 operating system. Job duties are to Analysis of current procedures and problems to refine and convert the data to programmable form; determine output requirements; study existing systems to evaluate effectiveness; correct systems/programs as necessary. Requires Associate Degree in Computer Science with 3 years of experience in software development required. 40 hours per week at $ 55,000 per year. Please send resume to Case # 19991116, PO Box # 8968, Boston, MA 02114.

Sr. Systems Analyst to design, develop, customize & implement developed processing applications for various operating systems using case tools like structure analysis & designing (STAAD) tool for Oracle application development (TOAD) to analyze & design systems specifications & application modules as per requirements in clarify application using clarify tools & C, C++ & pro *C programming interface. Must have Bachelors of Computer Sci., or equivalent & 6+ yrs of exp as an IT professional. 2+ yrs of exp in STAAD & TOAD using Oracle, Designer Pro * C, C & C++, 40 hrs p/w Salary: $70,000 p/a. Must have authority to work in the U.S. Send Resume to: Clear Technologies, LLC, PO Box 432, Buckingham, PA 18912.

SYSTEMS ANALYST, SENIOR (EAST SETAUKET, NY) Investment management firm seeks system analyst to design, develop, enhance & implement firmwide back-up systems, maintain NIS+ data base & system programs utilizing UNtX, TCP/IP & PPP, & provide system level support. Successful applicants must possess Master's in Computer Science, at least 1 year exp. as Systems Analyst or Systems Administrator. Salary commensurate w/exp. Mail resume to: RTC, 600 Route 25A, East Setauket, NY 11733. attn: JR.

SENIOR SYSTEMS ANALYST

Dosign and implement the Staff Management, Student Education and Group Life Programs using PowerBuilder 6.5 and Oracle 8. Develop, code, test and debug new software or enhancements to existing software, incl. gathering functional requirements, analyzing existing functionality of transfer application, documenting differences, developing estimates & establishing time-frames for software development. Manage team of junior programmers.

Requirements: Bachelor's Degree or equivalent in Engineering, Mathematics, Computer Science, plus 1 year experience in job offered or related occupation as Programmer, Systems Analyst, or Software Engineer OR three years experience as Programmer, Systems Analyst or Software Engineer. Candidate's experience to include one year develop. experience using PowerBuilder and one year develop. experience using Oracle databases. Salary $58,500/yr and up, depending on experience; M-F, 8-5. (NOTE: MULTIPLE OPENINGS). Submit copy of resume to Job Order # CO4662712, Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117. EOE. Applicants must be workers eligible to accept employment in the U.S. on a full-time basis.

Aukum, Inc. is seeking professionals such as Programmer Analysts, Software Engineers, and Software Consultants in the following areas:

Web developers with strong C + +, UNIX, Java, and scripting skills -

Creative Developer with background in XML, Java, Java Script, ASP -

Business Analysts with experience in designing and implementation of turnkey systems -

Additional skill sets sought:

LANGUAGES: Java, Servlet, JDBC, ASP, DHTML, HTML, XML, Java Script, PERL, COBOL, C, C + +, CGI Script, SOL, Visual C + +, Visual Basic
APPLICATIONS TOOLS: Broad Vision 4.0, Vignette, SAP,
IDE: Visual Café, Jbuilder, ColdFusion, EditPlus, Sybase, DB2
RDBMS: Oracle, Developer 2000, Designer 2000
Operating Systems: UNIX, Windows 95/NT, OS/2, Linux

Multiple positions exist. If you are interested, please mail your resume, clearly indicating the reference number: CW7, to Attention: Recruiting Department, Job. Ref. # CW7, Aukum, Inc., 30400 Helmandale Drive, Franklin, MI 48025.

ERGOSOFT offers custom business software development for the automotive industry and is expanding to the manufacturing and municipal markets. Due to dynamic growth, we require qualified IT professionals such as programmer analysts, systems analysts, software engineers and software consultants with experience in the following areas:

Operating Systems:	Windows NT, Windows 95, UNIX, MS-DOS, LINUX, Sun/OS, AIX, OS/2
Networking:	Novell Netware
Languages:	Java, Visual Basic, C++, C, COBOL, Pascal
Databases:	Oracle, Ms Access, SOL, SQL Server, FoxPro, Clipper, DB2, Sybase, Informix, DBA's, RDBMS
Web Related Technology:	HTML, JavaScript, VBScript, ASP, ActiveX, Java Beans, Corba, Net Object Fusion, VISUAL Cafe, Cold Fusion, JDBC, EJB, RMI, Web Sphere, DBC, JDK, JWS, IIS

If you are interested in a rewarding career opportunity, please mail your resume to:
Recruiting Department
ERGOSOFT
22190 W. 9 Mile Road
Southfield, MI 48034

Following software positions available for experienced IT professionals for an Atlanta, GA based consulting firm :

a) 3 AS/400 COBOL, RPG professionals with programming on commercial applications, expertise on methodologies using IEW, SILVERRUN and development tools such as Implementer and Hawkeye. Also 2 candidates with experience on J.D.Edwards 7.3 sales and distribution modules, financials and conversion experience using INSURE/90 required.

b) 2 positions for Oracle Developer and DBA, Oracle Workgroup server, Oracle Enterprise, Developer 2000, ERWIN on HP-UNIX and Win NT platforms.

c) 1 Strong SYBASE DBA and developer with atleast two years on Power Builder. Other skills needed for this position include SCO UNIX and SVR4 open system installation, management and routine administration experience, MF-CCBOL and Visual Basic programming.

Minimum salary $58000/year. Send resume to Bell USA Inc, 3235 Satellite Blvd, Bldg 400 Suite 300, Duluth GA 30096.

DATABASE ADMINISTRATOR

Database Administrator to do logical and physical design of Oracle database; Code test and implement Oracle scripts applying knowledge of Database Management Systems; Calculate optimum values for Oracle database parameters; performance tune Oracle databases; Model Oracle database security; manage backup and recovery of Oracle databases; make changes to Oracle database applications using expertise in Oracle database administration which includes logical design, physical design, performance tuning, backup and recovery, coding of scripts, knowledge of Oracle 7.3, SQL *DBA, Pro *C (tools) and PL/SOL (Language). Requirements: Bachelor's Degree or equivalent in Computer Science or related field and five years experience as a software engineer or database administrator, expertise in Oracle database administration which includes logical design, physical design, performance tuning, backup and recovery, coding of scripts, knowledge of Oracle 7.3, SQL *DBA, Pro *C (tools) and PL/SOL (Language). Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and relocation. Apply: Mr. Terrance Kinney, Armstrong County Team PA CareerLink, 1270 North Water Street, PO Box 759, Kittanning, PA 16201-0759, Job No. WEB107135.

Engineer

ENGINEER: Software

Assist with defining, designing, implementing and executing test cases, which verify the functionality of system and hardware. Assist with certifying new components, test tools, RAID enclosures, Drive enclosures, and new team equipment to be used by the integration team, including Unit Test Team, SI Team, Development Team, and others. Assist with preparing a unit test plan for each component, as well as track the test progress. Communicate issues with the vendors and generate test reports. Assist with making product recommendations to our Integrated Team Managers.
C programming language for implementing embedded code; O/S and embedded code level; SCSI Accessed Fault Tolerant Enclosure standards; SCSI Enclosure Services standards. Master of Science in Electrical Engineering, Computer Science, Computer Engineering, or equivalent field. No experience necessary. Entry level. Applicants must have proof of legal authority to work in the United States. Jobsite: Wichita, KS. Salary: $1,167.00/wk, 40 hrs/wk. Apply in person to any local Kansas Job Service Career Center or send a resume to KS Department of Human Resources Job# KS2300086 Attention: Jane W. Burbridge, 401 SW Topeka Blvd. Topeka, Kansas 66603-3182
EOE M/F/D/V

Software Engineer

Stoner Associates, a provider of utility simulation software in Carlisle, Pennsylvania, seeks a software engineer. This position involves designing, analyzing, prototyping, programming and testing of the engineering and numerical algorithmic aspects of fluid pipeline simulation software. The engineering aspects include network flow analysis in water and natural gas systems and water quality modeling, while the numerical algorithmic aspects include non-linear matrix solution techniques and optimization. Development follows modern software lifecycle processes. A qualified applicant should hold a masters degree in an engineering discipline or related field, and possess a strong educational background in mathematics, as well as programming proficiency in FORTRAN and C/C++. We offer a competitive compensation and benefits.

Please send your resume to:

Karl Brummer
Stoner Associates, Inc.
P.O. Box 86
Carlisle, PA 17013
Fax: 717-243-5564
email:
karl.brummer@stoner.com
E.O.E.

System Analyst

AIX Systems Analyst
Lockheed Martin currently has openings for a qualified AIX Computer Systems Analyst to work in **Orlando, Florida**.

Successful candidate will support production, monitor hardware/software management, and maintain system level IV & multiframes (SP2); root level needs for new applications using C/C++, UNIX, and COBOL; and perform upgrades & PFT/Mscro code research. Master's or Bachelor's in Computer Science/ Math/Economics or related field and relevant professional experience. For consideration, please send resume to: **Lockheed Martin, Attn: AD-COMPWRD, Fax: (877)244-0989 or E-mail: jobs.lmc@lmco.com (AD-COMPWRD must be in the subject line)**
Equal Opportunity Employer

Lockheed Martin

Software Engineers to design, develop, implement, and maintain complex engineering, business, accounting and management information applications and systems. Act as lead analyst in the development, implementation and maintenance of computer systems, including networked and client-server applications, requiring knowledge and experience across a variety of computing platforms, data bases and computer languages. Coordinate and instruct programmers and analysts assigned to his projects. Prepare feasibility studies of potential systems, configuration of components, interactive applications, and complex application specifications. Bachelor's in Computer Science or Engineering plus five yr. exp. in job offered or five yr. exp. a Programmer/Analyst or Systems Analyst, or Master's in Computer Science or Elec. Engineering - with the ability to perform the essential job duties, req. Salary: $65,562/yr. Job site: various unanticipated sites throughout the U.S. Employer location - Pittsburgh. Send this ad and your resume to Job# WEB105367, Anthony Gebicki, Westmoreland County CareerLink, 300 E. Hillis St., Youngblood, PA 15697-1808.

Systems Analyst to analyze user requirements, procedures and problems to improve existing computer systems and software. Confer with user personnel to analyze current operational procedures, identify problems, and learn specific input and output requirements. Write detailed descriptions of user needs, program functions, and steps required to develop or modify computer programs. Review computer system capabilities to determine if requested program or program change is possible within existing systems. Evaluate effectiveness of existing information processing systems. Study development of new information systems to meet current and projected needs. Plan and prepare documentation of the program development. Upgrade systems and correct errors to maintain systems after implementation. Bachelor or equivalent in Computer Sci. plus two yr. exp. in job offered or two yr. exp. as Programmer req. Salary $54,000/yr. Job site: various unanticipated sites throughout the U.S. Employer location: Pittsburgh. Send resume to: Job# WEB105378, Terrance Kinney, Armstrong Country CareerLink, 1270 N. Water St., PO Box 759, Kittanning, PA 16201-0759.

Programmer/Analyst to plan, develop, test and document computer programs, applying knowledge of programming techniques and computer systems. Evaluates user requests for new or modified programs to determine feasibility and cost and time required, compatibility with current systems and computer capabilities. Formulates plans outlining steps required to develop program; converts project specs into sequence of detailed instructions and logical steps for coding into language processable by computer, applying knowledge of computer languages. Analyzes, reviews and alters programs to increase operating efficiency or adapt to new requirements. Installs and tests programs at user site and consults with user personnel on site. Bachelor in Computer Sci. or Elec. Eng., plus two yr. exp. in job offered of 2 yr. exp. as Systems Analyst or Software Engineer req. Salary $55,230/yr. Job site: various unanticipated sites throughout the U.S. Employer location: Pittsburgh. Send resume to Job# WEB105375, Thomas Dembosky, Indiana Job Center, 350 N. Fourth St., Indiana, PA 15701-2000.

Newbridge Networks is an international company specializing in state-of-the-art digital networking communications systems. We've been designing, developing and delivering these systems for 13 years to customers throughout the U.S. and the world.
We are recruiting for all types of professionals, including: software engineers; design engineers; systems engineers; principal engineers; support engineers; field support engineers; senior field engineers; new product introduction engineers; test engineers; product support software engineers; software engineering specialists; application systems specialists; senior engineering specialists; firmware engineering specialists; training managers; senior and other members-technical staff; product marketing managers.
We have openings throughout the U.S. including: Chantilly, VA; Andover, MA; Chicago; Dallas and Houston; Miami; Philadelphia; San Ramon, Santa Clara and Sunnyvale, CA; Denver; and Bloomington, MN.
We offer competitive salaries and comprehensive benefits. Please send your resume to : Newbridge Networks Inc., HR-Resumes, Dept. CW, 15036 Conference Center Drive, Chantilly, VA 20151
Email: hrnsa@newbridge.com. Fax: 703-679-5114. EOE

Software Engineers: Conduct research & develop, test & maintain programs, which comprise a portion of a system product or future products. Exp &/or background in the following areas (not all req): relational database systems, database management systems, distributed management and recovery techniques, TCP/IP, Socet IPC, C, C++, SOL, AIX, UNIX, JAVA, object-oriented programming languages, Lotus Notes, Windows (95-98, NT) operating systems, 80x86 assembly language, SoftIce debugger and device drivers for Windows, data security, Internet/Intranet WEB applications, HTTP, CGI, graphical user interfaces, object - oriented analysis and design techniques, domain modeling techniques, version management, configuration management, multimedia standards (MPEG-4, H.2xx, H.3xx, G.7xx. RTP/RTSP). Req: MS in CS/Math/ME/EE/Comp Eng + 1, 2 or 3 yrs exp (or equivalent) depend on position or B.S. + 3-5 yrs exp depend on position in Hawthorne or Yorktown Heights, NY. Competitive salary. Please send resume w/clipping of ad to: IBM Corporation Technical Recruiting, Job Code CW06A00, P.O. Box 218, Yorktown Heights, NY 10598. An equal opportunity employer.

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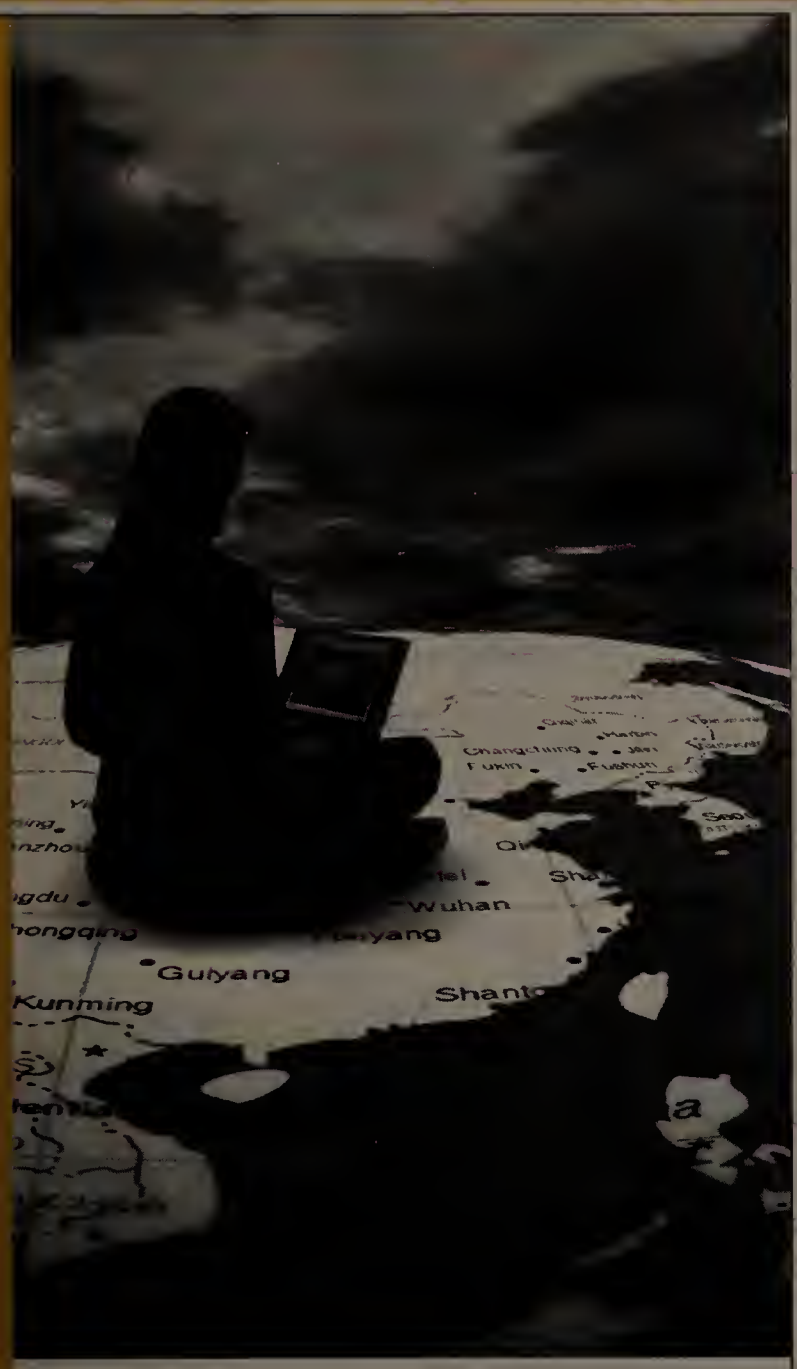

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Documentum	19.88
Tibco Software Inc.	17.94
Juniper Networks Inc.	15.00
Rational Software Corp.	11.56
Manugistics Group Inc.	9.38
Entrust Technologies Inc.	8.56
Lexmark International Group Nc.	8.38
Active Software	8.13

LOSERS

PERCENT	
Unisys	-41.4
Red Hat Inc.	-21.2
Network Computing Dev	-19.6
LSI Logic	-19.2
TenFold Corp.	-18.6
Analog Devices	-18.5
Renaissance Worldwide	-17.2
Synopsis	-16.8

DOLLAR	
Analog Devices	-17.19
LSI Logic	-12.81
Network General	-12.69
Hughes Electronics/GM	-12.69
Qualcomm	-11.63
National Semiconductor	-11.13
Advanced Micro Devices	-10.75
Unisys	-10.25

Dot-Coms Struggle To Meet Expectations

Analysts: High standards hurting online companies

BY MEGHAN HOLOHAN

TWO WEEKS AGO, on the day an analyst at Lehman Brothers Holdings Inc. called Amazon.com Inc.'s [Nasdaq:AMZN] credit "weak and deteriorating," its stock plummeted 19%.

Around that time, San Francisco-based PlanetRx.com Inc. [Nasdaq:PLRX] lowered its second-quarter earnings projections by $2 million, causing analysts to question its viability.

But PlanetRx has traditionally had a strong presence in its market, second only to Bellevue, Wash.-based Drugstore.com Inc. [Nasdaq:DSCM]. And Seattle-based Amazon.com is the leader in its market.

So why are these companies shuddering in the wake of analysts' reports?

INDUSTRY ALMANAC

Investors in online-only operations demand higher profits in less time than they do from traditional companies, says Mark Miller, an equity analyst at William Blair & Co. in Chicago.

Another problem is that young companies are still trying to figure out the market and how to sell online, says Steve Weinstein, vice president of research analysts at Pacific Crest Securities in Portland, Ore.

"Expectations do get ahead of reality," he says. "When looking at a company that's only a year old, you can't expect them to do everything right." Online businesses and brick-and-mortar companies can't be evaluated with the same guidelines, because they're two different business models, Weinstein says.

Online businesses seem to be a stronger investment, he says, because they can reach a wide market without investing time and money in brick-and-mortar infrastructures. However, Weinstein adds, the trade-off is that they're often unstable.

But Sara Farley, an e-commerce analyst at New York-based PaineWebber Inc., says both types of business should be held to the same standards because both business models are concerned with profitability and viability.

One remedy to many of the recent woes of online companies is to partner with traditional businesses, the way Drugstore.com did with Rite Aid Corp. [NYSE:RAD] and General Nutrition Cos., says Tom Wyman, an analyst at New York-based J. P. Morgan & Co.

"I think that investors are increasingly looking at the models of business, and increasing profitability is the main concern," Farley says.

Weak Days

The closing stock prices of PlanetRx and Amazon.com the day before and the day after analysts questioned their performance:

EXCH	52-WEEK		RANGE	JUNE 30 2 PM	WK NET CHANGE	WK PCT CHANGE
SOFTWARE UP 3.2%						
ASWX	149.12	11.00	Active Software	80.13	8.13	11.3
ADBE	132.00	33.50	Adobe Systems Inc.	128.03	6.66	5.5
ARBA	183.34	15.25	Ariba Inc.	94.88	2.81	3.1
AZPN	55.37	8.12	Aspen Technology Inc.	37.75	2.88	8.2
ADSK	56.06	17.00	Autodesk Inc.	34.00	-0.19	-0.5
AVID	25.56	8.75	Avid Technology	11.81	0.19	1.6
BAANF	17.81	1.12	Baan Co. N.V.	2.66	0.09	3.7
BMC5	86.62	35.00	BMC Software Inc.	36.06	-0.63	-1.7
BOBJ	150.87	14.50	Businesss Objects S.A.	89.00	3.00	3.5
CDN	24.62	9.18	Cadence Design Systems	20.50	1.25	6.5
CHKP	295.00	21.34	Checkpoint Software Tech. Ltd.	212.75	-1.13	-0.5
CTXS	122.31	17.50	Citrix Systems Inc.	19.00	0.38	2.0
COGN	45.25	9.68	Cognos Inc.	41.13	1.00	2.5
CA	79.43	42.31	Computer Associates Int'l Inc.	51.31	0.94	1.9
CPWR	40.00	9.25	Compuware Corp.	10.38	-0.81	-7.3
DCTM	106.00	12.18	Documentum	89.13	19.88	28.7
EFII	69.31	22.00	Electronics For Imaging	25.81	2.13	9.0
HNC5	130.00	25.87	Hnc Software	60.00	6.34	11.8
HY5L	65.00	14.25	Hyperion Software	34.63	3.13	9.9
IDXC	49.12	10.37	IDX Systems	14.50	2.53	21.1
INFA	110.87	10.68	Informatica Corp.	77.25	7.38	10.6
IFMX	21.25	6.18	Informix Software Inc.	7.22	-1.22	-14.4
INTU	90.00	22.50	Intuit	40.19	2.13	5.6
JKHY	53.00	15.50	Jack Henry Associates	47.75	2.00	4.0
JDEC	48.31	10.25	J.D. Edwards & Co.	18.13	-0.56	-3.4
LGTOE	82.50	9.25	Legato Systems Inc.	15.19	0.94	6.6
MACR	114.75	27.37	Macromedia Inc.	96.50	5.50	6.0
MANU	70.25	8.68	Manugistics Group Inc.	45.88	9.38	25.7
MENT	20.56	7.75	Mentor Graphics	20.06	0.44	2.2
MSFT	119.93	60.37	Microsoft Corp.	78.50	0.44	0.6
NETA	37.18	12.75	Network Associates	20.81	-0.19	-0.9
GMH	140.00	48.75	Network General	89.38	-12.69	-12.4
NOVL	44.56	7.87	Novell Inc.	9.09	0.13	1.4
ORCL	90.00	12.43	Oracle Corp.	83.00	2.88	3.6
PMTC	35.93	7.37	Parametric Technology Corp.	11.00	0.81	8.0
PSFT	27.75	12.00	PeopleSoft Inc.	16.38	1.06	6.9
PIXR	50.62	32.20	Pixar	35.56	1.69	5.0
RATL	105.00	26.37	Rational Software Corp.	95.06	11.56	13.8
RHAT	151.31	7.00	Red Hat Inc.	25.75	-6.94	-21.2
QSFT	98.12	7.00	Quest Software	54.63	-0.66	-1.2
SAP	85.93	29.37	SAP AG	45.88	-2.63	-5.4
SCUR	29.62	2.25	Secure Computing Corp.	18.38	3.00	19.5
SDRC	20.00	8.81	Structural Dynamics Research	15.25	0.84	5.9
SYBS	31.00	9.12	Sybase Inc.	22.69	-0.56	-2.4
SYMC	81.62	22.62	Symantec Corp.	54.72	-4.78	-8.0
SNPS	75.62	34.37	Synopsis	34.69	-7.00	-16.8
SCTC	28.37	10.00	Systems & Computer Technology	18.75	1.56	9.1
TIBX	147.00	5.00	Tibco Software Inc.	104.44	17.94	20.7
T5AI	48.12	11.37	Transaction Sys. Architects	16.66	-0.22	-1.3
VRTS	174.00	18.88	Veritas Software Corp.	112.13	-7.00	-5.9
WIND	66.12	13.37	Wind River Systems Inc.	36.94	-1.63	-4.2
TELECOMMUNICATIONS CARRIERS OFF -3.6%						
AT	91.81	55.87	Alltel Corp.	62.06	-3.38	-5.2
ANDW	42.06	11.18	Andrew Corp.	31.88	-4.19	-11.6
T	61.00	31.81	AT&T	31.81	-2.94	-8.5
BCE	137.50	21.06	BCE Inc.	23.88	-0.06	-0.3
BEL	69.50	47.37	Bell Atlantic	50.56	-6.75	-11.8
BLS	53.50	34.93	Bell South	43.19	-1.38	-3.1
BRW	41.06	16.31	Cincinnati Bell Inc.	24.94	-0.06	-0.3
CMCSK	57.68	27.87	Comcast	39.56	2.31	6.2
CQ	37.06	15.37	Comsat Corp.	24.19	0.69	2.9
COX	58.37	33.37	Cox Communications Inc.	46.81	-0.69	-1.4
GSTRF	53.75	5.81	Globalstar Telecom. Ltd.	8.75	-0.06	-0.7
GTE	78.50	55.81	GTE Corp.	61.44	-8.13	-11.7
NXTL	82.93	17.93	Nextel Communications	57.75	1.00	1.8
SPDT	74.25	29.37	Panamsat	44.44	-2.25	-4.8
QCOM	200.00	22.65	Qualcomm	59.00	-11.63	-16.5
SBC	59.87	34.81	SBC Communications	44.44	-4.31	-8.8
FDN	75.93	42.62	Sprint Corp.	52.56	-7.44	-12.4
TDS	137.00	65.50	Telephone and Data Systems	104.19	-2.81	-2.6
USW	92.87	51.75	U5 West	83.69	-5.31	-6.0
VIA	71.25	36.68	Viacom	70.38	5.25	8.1
WCII	66.50	24.00	Winstar Communications Inc.	33.75	-4.69	-12.2
WCOM	64.51	35.87	MCI Worldcom Inc.	45.31	7.25	19.0
SERVICES OFF -0.6%						
ACXM	35.93	14.56	Acxiom Corp.	28.69	-0.31	-1.1
ACS	53.00	31.00	Affiliated Computer Servs	33.56	-0.19	-0.6
AMSY	44.37	19.75	American Mgt. Systems	33.13	-4.38	-11.7
AUD	57.93	37.37	Automatic Data Processing	52.25	-0.75	-1.4
BSYS	69.00	41.37	Bisys Group Inc.	62.50	-1.13	-1.8
CATP	27.00	6.75	Cambridge Technology Ptnrs	8.38	0.91	12.1
CEN	35.25	14.75	Ceridian	23.50	-1.94	-7.6
CBR	29.81	12.50	Ciber Inc.	13.44	-1.88	-12.2
CDO	57.25	17.43	Comdisco	23.25	-1.44	-5.8
CHRZ	27.12	10.37	Computer Horizons Corp.	13.50	1.63	13.7
CSC	99.87	57.93	Computer Sciences	72.44	-1.63	-2.2
DST	85.37	51.18	Dst Systems Inc.	78.38	-1.38	-1.7
EDS	76.68	38.37	Electronic Data Systems	41.81	2.44	6.2
FDC	57.68	38.93	First Data Group	50.56	0.69	1.4
FISV	50.37	24.12	Fiserv	46.16	1.16	2.6
IT	23.37	9.56	Gartner Group	12.88	1.13	9.6
KEA	35.00	18.06	Keane	21.81	-0.13	-0.6
NDC	52.06	20.75	National Data	24.13	2.19	10.0
PAYX	44.25	15.70	Paychex Inc.	41.00	3.25	8.6
PER	29.56	9.31	Perot Systems Corp.	10.94	1.31	13.6
REGI	9.75	1.50	Renaissance Worldwide	1.50	-0.31	-17.2
REY	33.00	17.75	Reynolds & Reynolds	18.94	-0.63	-3.2
SFE	99.00	15.85	Safegard Scientifics	34.63	-1.50	-4.2
SAPE	151.18	23.87	Sapient Corp.	104.38	3.63	3.8
SMS	73.00	35.50	Shared Medical Systems	72.94	0.06	0.1
SDS	40.00	16.87	Sungard Data Systems	30.25	-2.25	-6.9
SYNT	20.93	7.87	Syntel Inc.	9.88	-0.69	-6.5
TECD	44.68	18.00	Tech Data	42.88	3.44	8.7
TENF	76.87	15.25	TenFold Corp.	17.00	-3.88	-18.6
TSS	20.62	14.12	Total System Services Inc	17.25	-0.75	-4.2
TSAI	48.12	11.37	Transaction Sys. Architects	16.66	-0.22	-1.3
NETWORK UP 0.9%						
COMS	119.75	22.62	3Com Corp.	57.31	7.44	14.9
ADCT	85.12	17.18	ADC Telecommunications Inc.	81.38	4.94	6.5
ANTC	61.25	23.25	Antec	40.25	0.38	0.9
CS	52.75	11.12	Cabletron Systems	25.13	4.00	18.9
CNEBF	7.06	2.37	Call-Net Enterprises	2.50	0.38	13.0
CSCO	82.00	26.37	Cisco Systems Inc.	61.88	-1.56	-2.5
ECIL	39.50	23.75	ECI Telecom	35.88	0.75	2.1
ENTU	150.00	16.87	Entrust Technologies Inc.	74.75	8.56	12.9
EPRE	40.56	6.25	ePresence Inc.	7.38	-0.75	-9.2
HRS	39.93	15.50	Harris Corp.	33.19	0.69	2.1
GMH	140.00	48.75	Hughes Electronics/GM	89.38	-12.69	-12.4
ERICY	26.31	6.70	LM Ericsson	19.81	0.00	0.0
JNPR	156.46	5.66	Juniper Networks Inc.	139.75	15.00	12.0
LU	84.18	49.81	Lucent Technologies	58.06	-2.94	-4.8
MADGF	17.37	1.43	Madge Networks	4.63	-0.28	-5.7
NCDI	9.62	1.12	Network Computing Dev	1.16	-0.28	-19.6
NWK	14.81	7.31	Network Equipment Tech.	10.88	-0.06	-0.6
NOK	62.50	17.68	Nokia Corp	50.19	-2.50	-4.7
NT	72.09	17.93	Northern Telecom Ltd.	70.44	5.06	7.7
PAIR	38.00	8.00	Paircain Technologies Inc.	34.19	1.44	4.4
PCTL	15.21	1.87	Picturetel	2.94	-0.44	-13.0
SFA	77.93	15.84	Scientific Atlanta	74.44	4.19	6.0
TLAB	77.25	41.81	Teltabs Inc.	69.88	7.63	12.2
USW	92.87	51.75	U5 West	83.69	-5.31	-6.0
VRLK	22.00	1.81	Verilink	9.88	1.44	17.0
W5TL	40.75	6.12	Westell Technology Inc.	14.81	-0.25	-1.7
SEMICONDUCTORS, CHIPS & EQUIPMENT OFF -5.4%						
ADPT	63.56	15.37	Adaptec Inc.	21.63	2.59	13.6
AMD	97.00	15.62	Advanced Micro Devices	78.63	-10.75	-12.0
ALTR	116.43	31.50	Altera	102.06	-4.00	-3.8
ADI	100.00	19.15	Analog Devices	75.75	-17.19	-18.5
AMAT	115.00	26.75	Applied Materials	89.88	-2.75	-3.0
ASML	50.25	14.50	ASM Lithography Holding	43.75	0.06	0.1
FCS	49.50	18.50	Fairchild Semiconductor Corp.	40.63	-2.38	-5.5
HRS	39.93	15.50	Harris Corp.	33.19	0.69	2.1
INTC	145.37	50.12	Intel Corp.	131.69	-4.88	-3.6
KLAC	97.75	21.18	Kla Instruments	59.00	-1.56	-2.6
LLTC	74.75	25.81	Linear Technology	62.25	-3.63	-5.5
LSI	90.37	18.56	LSI Logic	54.06	-12.81	-19.2
MXIM	77.68	25.43	Maxim Integrated Products	66.50	-3.31	-4.7
MU	94.50	18.00	Micron Technology	91.19	3.06	3.5
MOT	61.54	26.25	Motorola	29.88	-2.31	-7.2
NSM	85.93	17.68	National Semiconductor	58.19	-11.13	-16.1
STM	73.87	18.66	SGS-Thomson Microelectronics	63.69	-2.88	-4.3
SLR	49.50	26.12	Solectron Corp.	41.38	1.06	2.6
TER	115.43	25.78	Teradyne	74.88	-6.69	-8.2
TXN	99.78	26.35	Texas Instruments	69.19	-7.06	-9.3
JDSU	153.42	16.23	Uniphase	119.25	-5.13	-4.1
VTSS	115.68	26.87	Vitesse Semiconductor Corp	76.13	-8.88	-10.4
XLNX	98.31	20.28	Xilinx	82.56	-8.25	-9.1
COMPUTER SYSTEMS OFF -0.4%						
AAPL	75.18	21.03	Apple Computer Inc.	54.31	1.19	2.2
ASPX	19.00	3.87	Auspex Systems	4.78	-0.03	-0.6
BEDS	39.56	3.28	Be Inc.	4.94	-0.28	-5.4
CPQ	34.00	18.25	Compaq	25.31	-2.56	-9.2
DELL	59.68	31.37	Dell Computer Corp.	49.06	1.06	2.2
GTW	84.00	28.37	Gateway 2000 Inc.	58.75	1.38	2.4
HWP	155.50	67.00	Hewlett-Packard Co.	123.31	5.38	4.6
HIT	164.50	74.50	Hitachi Ltd.	144.25	5.94	4.3
IBM	139.18	89.00	IBM	110.13	-2.69	-2.4
MUEI	20.68	8.18	Micron	12.25	0.50	4.3
MOT	61.54	26.25	Motorola	29.88	-2.31	-7.2
NATI	59.50	24.75	National Instruments Corp.	43.00	1.75	4.2
NCR	52.62	26.68	NCR	39.38	-0.38	-0.9
NIPNY	161.50	53.62	NEC	158.44	0.06	0.0
PRCM	89.75	4.31	Procom Tech Inc.	53.75	4.50	9.1
SGI	18.87	3.06	Silicon Graphics Inc.	4.00	0.25	6.7
SNE	157.37	44.62	Sony	94.75	0.38	0.4
SUNW	106.75	28.96	Sun Microsystems	89.25	1.06	1.2
TRCD	22.75	2.25	Tricord Systems	17.44	2.56	17.2
UIS	49.68	14.50	Unisys	14.50	-10.25	-41.4
INTERNET UP 0.4%						
AMZN	113.00	32.46	Amazon.com	36.38	2.94	8.8
ADL	95.81	38.46	America Online	51.94	-2.31	-4.3
ATHM	64.12	15.87	@home Corp.	19.63	0.25	1.3
CKFR	125.62	23.12	Checkfree	49.06	-2.81	-5.4
CYCH	16.00	4.25	Cybercash Inc.	5.63	0.00	0.0
EBAY	127.50	35.14	eBay Inc.	52.56	0.69	1.3
ETYS	86.00	4.50	eToys Inc.	6.25	0.84	15.6
EGRP	44.00	13.12	ETrade Group Inc.	16.75	-0.31	-1.8
LCOS	93.62	28.56	Lycos Inc.	54.00	-0.50	-0.9
OMKT	65.50	7.87	Open Market Inc.	13.06	-0.94	-6.7
OTEX	60.62	9.50	Open Text Corp.	21.50	-1.47	-6.4
PCLN	119.43	33.06	Priceline.com Inc.	36.25	-5.00	-12.1
PRGYA	35.43	8.25	Prodigy Communications	10.38	-0.56	-5.1
PSIX	60.93	15.53	PSINet Inc.	24.75	-0.63	-2.5
RSAS	93.06	15.87	Security Dynamics	69.19	6.31	10.0
SPYG	95.25	9.68	Spyglass Inc.	32.00	-0.63	-1.9
WINK	75.00	6.00	Wink Communications Inc.	30.88	5.13	19.9
YHOO	250.06	55.00	Yahoo Inc.	121.38	-3.06	-2.5
STORAGE & PERIPHERALS UP 1.9%						
ADPT	63.56	15.37	Adaptec Inc.	21.63	2.59	13.6
APCC	45.00	16.00	American Power Conversion	41.00	2.81	7.4
CANNY	51.75	24.25	Canon Inc.	50.00	1.50	3.1
DBD	32.87	19.68	Diebold Inc.	28.56	-0.31	-1.1
EK	78.28	53.18	Eastman Kodak Co.	61.94	3.44	5.9
EMC	82.62	23.65	EMC	73.63	-2.38	-3.1
IOM	6.37	2.87	Iomega	4.00	-0.13	-3.0
MXTR	14.81	4.25	Maxtor Corp.	10.63	-0.63	-5.6
NTAP	124.00	9.84	Network Appliance Inc.	79.00	1.38	1.7
LXK	135.87	56.00	Lexmark International Group Nc	69.00	8.38	13.8
SEG	75.43	25.12	Seagate Technology	55.44	-2.31	-4.0
STK	27.18	10.62	Storage Technology	12.13	0.50	4.3
TEK	76.93	22.12	Tektronix	73.13	0.19	0.3
XRX	62.12	18.56	Xerox	19.31	0.69	-3.4

KEY: **(H)** = New annual high reached in period
(L) = New annual low reached in period

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Verio

in the Web hosting market.

Although many of those affected were small businesses, Verio also sells bandwidth to application service provider Agilera Inc. in Englewood, Colo., which serves large firms.

Schneider said not all the problems can be blamed on Verio, because the Internet is so complex.

Laura Zung, Verio's vice president of product management, acknowledged that some sites hosted in Vienna were slow, but, she said, "their sites were not dead for five days."

Some customers disagreed.

Charles Rice, CIO at Coatingsmart.com Inc. in Ann Arbor, Mich., said the outage prevented his start-up from registering companies for an online exchange for industrial and specialty paints and coatings.

> This isn't Joe Bob's Web hosting service and auto repair.
>
> CHARLES RICE, CIO, COATINGSMART INC.

Rice, who was previously vice president of technology at bookseller Borders Group Inc., also in Ann Arbor, said a five-day outage was unacceptable.

"If we had a five-day outage [at Borders], I doubt I would have just been fired," Rice said. "I would have been drawn and quartered. This isn't Joe Bob's Web hosting service and auto repair."

Last week, customers who bought Web access through a Verio reseller complained of similar outages.

"Some companies' Web sites are dead. Dead and buried. My site has been dead now for six days," wrote Christopher Mott in an e-mail message.

Mott is president of Mott's Miniatures & Doll House Shop Inc. in Buena Park, Calif. His site is hosted by ABI Hosting Inc. in Durham, Calif. He said he has lost tens of thousands of dollars in orders since June 23.

Thursday, ABI sent an e-mail to its customers saying, "ABI Hosting was involved in a recent Verio disaster at their Virginia facility."

Faulty Hardware Blamed

Schneider blamed the problem on faulty hardware. Flawed software prevented nightly data backups, he said.

"We've been working again on recovering that data," Schneider said. "We are working with a professional data services recovery company."

Zung said this is the first such problem at Verio. She added that Verio will give all affected customers a free month of services and is installing new software.

An analyst who asked not to be identified said it took as long as 20 minutes to download three pages from her Verio-hosted site as long ago as May 13.

After weeks of Verio technical support blaming the analyst's Internet service provider, Verio acknowledged that the Vienna routers were the problem, she said. At that point, she asked that her site be hosted at Verio's Boca Raton, Fla., site.

Everything worked fine until last Monday. "I cannot save the server," she said.

Customers said a refund is too little, too late.

"The lesson there, I guess, is that I would gladly pay a hundred times what I got refunded not to have the outage," Rice said.

Continued from page 1

Merger

into their frame-relay cloud, and that cloud was full of lightning bolts."

CIT Group is a financial services company that needs instant information, and the network slowdown "killed us," said Fischer.

Fischer said CIT Group moved back to AT&T Corp. to handle the lion's share of its telecommunications requirements just 19 months after contracting with WorldCom. AT&T now handles 90% of his company's business, while WorldCom has 10%, he said.

While Fischer said he would like to see WorldCom "grow organically instead of by acquisition," Tim Talbot, vice president of technology services at PHH Vehicle Management Services LLC in Hunt Valley, Md., said he's more amenable to the merger.

"I don't see how [the Sprint/WorldCom merger] differs with what Bell Atlantic has done with Verizon. It's my opinion that clients and customers would benefit [from more services]," he added.

Verizon Communications in Bedminster, N.J., is the telecommunications firm slated to be formed by the merger of GTE Corp. in Irving, Texas, and Bell Atlantic Corp. in New York. The merger was approved by the Federal Communications Commission June 16.

DUANE WILLIAMSON: "[WorldCom] is about to reach . . . saturation"

Still, Talbot said he does have one reservation about the proposed deal. "My only concern," he said, "is that you're narrowing the players in the market. Look at the price of gas. There's something funny about that. I wouldn't want the same thing to happen here [in telecommunications]."

Less Choice

David Willis, an analyst at Meta Group Inc. in Stamford, Conn., said he agrees that paring down the number of big telecommunications providers could limit customer choice. "The only alternative that customers were going to have [other than WorldCom and AT&T] for switched voice, ATM and frame relay was going to be Qwest." Denver-based Qwest Communications International Inc.'s delivery capabilities, he said, "aren't there."

Fischer is adamant about the need for reliability and service from telecommunications vendors. "You don't have those, you're out of business," he said.

Duane Williamson, director of telecommunications at Budget Rent-A-Car Corp. in Lisle, Ill., said he believes consistent service levels are important, too. He stayed with AT&T because of the service it offered after a review that included WorldCom and Sprint. He said WorldCom "is about to reach a point of saturation, a point where they are going to be out of control."

A spokesman for Sprint said neither Sprint nor WorldCom would comment on customer reactions to the merger.

Approval of the merger could have forced one aerospace company to change providers, according to George Sullivan, a senior network architect at a company whose name he didn't want disclosed.

His company contracts with Sprint for most voice communications and with WorldCom for data traffic. If the two companies merged, said Sullivan, "I believe there would be no incentive to be sure their customers would be getting the best possible prices."

But Carl Garland, an analyst at Current Analysis Inc. in Sterling, Va., said he believes the merger is far from dead — with one caveat. "Sprint is starting to pick up the pace with some new products," such as the rollout of fixed broadband wireless services in Phoenix and Tucson, Ariz. "This suggests to me that they may be trying to implement a contingency plan," he said.

Should Sprint and WorldCom not merge, some analysts say Sprint could be a takeover target for a European company, such as Germany's Deutsche Telekom AG.

New Alliance Aimed at Small Firms

BY JULIA KING

Ariba Inc. and The EC Co. are trying to level the e-business playing field for small and midsize suppliers, often referred to as "the forgotten 5 million."

Under a deal announced last week, EC, a Palo Alto, Calif.-based e-commerce services firm, will provide suppliers with free software to electronically receive and process orders placed by large corporate buyers using procurement software from Ariba, in Mountain View, Calif.

Once connected to EC's network, the smaller suppliers — many of which now do business by telephone and fax — can conduct all business electronically. Suppliers can download the EC software from the company's Web site.

The EC software functions much like a value-added network, handling all the transaction processing behind the scenes. Suppliers pay a monthly service fee based on transaction volume.

Procurement experts say many large companies typically bypass small and midsize suppliers that can't process their orders electronically. Paper-based transactions are too expensive and prone to inaccuracies.

Electronically exchanging documents also significantly cuts costs. A paper-based transaction typically costs between $20 and $150, compared with an Internet transaction that costs between 10 cents and $2, according to Carl Lehmann, an analyst at Meta Group Inc. in Stamford, Conn.

Yet Chris Silva, an analyst at International Data Corp. in Framingham, Mass., said cost savings isn't usually a supplier's primary motive for moving its business to the Internet. Instead, Silva said, the main motivation is to gain greater access to larger buyers.

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FRANK HAYES/FRANKLY SPEAKING

Project fireworks

EVERYTHING I NEED to know about project management, I learned on the Fourth of July. Well, OK, not everything — they didn't have Gantt charts in 1776. But it turns out that running a revolution and pushing through an IT project aren't that different. Think the universal laws of projects came from some high-priced business analyst blowing gas last week? Then maybe we should review some history — those laws were true 224 years ago, too.

You'll never get the project schedule right. In 1776, the British figured putting down the uprising in the American colonies would take one season of military campaigns, tops. King George III was exasperated when the war was still going in 1777. But the last of the fighting didn't end until November 1782 — making it a six-month project that lasted six years.

Users will take forever to sign off on a project. The British surrendered at Yorktown in 1781, but King George didn't sign the peace treaty until 1783. Then again, even though fighting began in April 1775, the war didn't officially start — with the Declaration of Independence — until more than a year later.

Dead ends happen, so make contingency plans. Remember Paul Revere? He never made it all the way to Concord, Mass., on his famous ride to rouse the Minutemen on April 18, 1775. Revere ran into a British patrol after he reached Lexington and was captured. But because there were two other riders taking different routes, one of them — Samuel Prescott — made it all the way through to Concord.

Never underestimate the problem of users who aren't on board. Fully a third of the American colonists actively opposed the revolution. The loyalists ratted on the radicals, aided the British with sabotage and joined the redcoat army by the thousands. Another third of the colonists didn't care who won, reckoned John Adams. With only one-third of the colonists supporting it, the revolution was lucky to get off the ground at all.

Bringing in an army of outside consultants won't guarantee success. The British made the redcoat army their largest overseas military expedition ever by beefing it up with Hessian mercenaries. But the rent-an-army approach didn't pay off.

The rent-an-army approach failed the British.

The Hessians were defeated and captured hundreds at a time in the first years of the war, when they should have made the biggest difference — including 900 caught the morning after George Washington crossed the Delaware.

Training is always worth the price. After a year of watching his amateur army get beaten up all through 1777, Washington spent the winter at Valley Forge. But in the spring, Washington's own hired gun arrived — the Prussian Baron von Steuben, who brought the army up to speed on faster musket-loading technology and how to march together.

After that — well, they won the war, didn't they?

Politics can snatch defeat from the jaws of victory. And you thought finessing *your* office politics was tough. In the last months of the war — when it was all over except for the treaty-signing — a group of American officers led by Major General Horatio Gates tried to organize a revolt to dump Washington as commander in chief and take over the government. (Gates had tried ousting Washington before, in 1777, and still smarted from the failure.)

Gates didn't realize it, but he was being played for a sap by the Federalists in Congress. Alexander Hamilton first egged on Gates and then tipped off his old boss, Washington, who had to block the plot with soft words because treating it like the mutiny it was would have ripped the army apart.

In any case, remember: If your project does crash and burn, at least the fate of a nation isn't at stake. ◗

Hayes, Computerworld's staff columnist, has covered IT for more than 20 years. His e-mail address is frank_hayes@computerworld.com.

SHARK TANK

WHAT? NO PEN? An edict comes from on high to a trucking company's IT department: All pilot fish must now wear little notebooks on chains around their necks. "So much communication happens in the halls, elevators and bathroom," insider fish says. "Management wants to be sure we have something to take notes on."

CONSULTANT PILOT FISH on the golf course with a customer inquires about a 3-year-old ERP project that has yet to show any results. Did senior management know about the delays and missed target dates? "With a straight face, I was told the project was not late because the project management team 'descoped' the original plan rather than miss a target date," the fish reports. "So what was actually completed at a milestone date became what should have been the original scope – and therefore the project was not late."

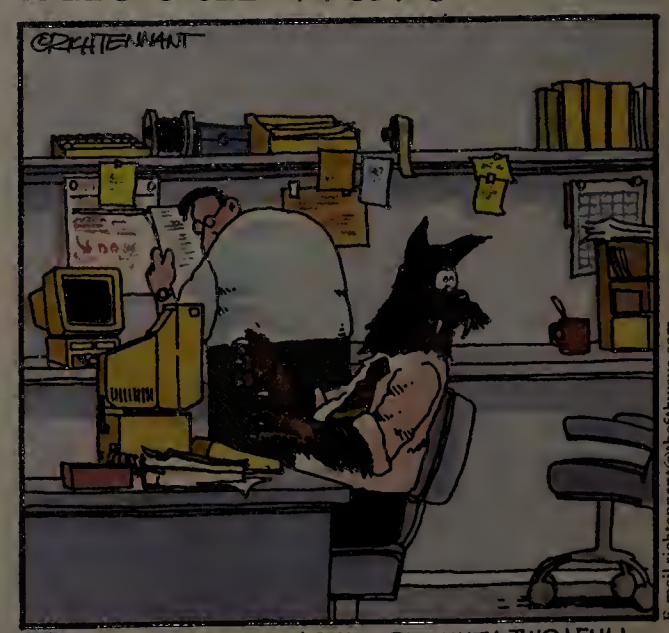
NETWORK OPERATIONS pilot fish gets the word from the VP of IS that, with lots of new projects rolling out in the coming months, everyone must really be on top of the new technology involved in order to support it. "However, there's no money for training unless it's free," grumbles the fish. Staffers can buy books – but they won't be reimbursed. Or they can take free classes offered by vendors, but they won't be reimbursed for flights or hotel stays. Result: "People are driving four to five hours round-trip per day to get training," the fish says – because the company *will* reimburse mileage.

A THIEF WALKS OFF with the CPUs, hard drives and memory from a couple of PCs at a big electronics company. That gnaws at an engineering manager until he "comes up with a brilliantly pre-Eli Whitney idea," says a pilot fish. "He gave me a month to redesign those components so that, if someone steals them, they will not work in another computer."

THAT EXPLAINS IT This pilot fish lands a job as CIO for a state government agency and spends much of his first 18 months learning to navigate the political environment. Finally, his boss explains the way of the world: "One of your challenges is you are too logical," he tells the fish with all seriousness. "Logic does not work here!"

Feed the Shark: **sharky@computerworld.com.** If your story sees print, you get a Shark shirt. And yeah, Sharky knows the redesign of *Computerworld*'s Web site broke your links to the Sharkives – you won't get a T-shirt for telling me that. Get the daily feed *and* the Sharkives now at *computerworld.com/sharky*.

The 5th Wave



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Or contact:
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Storage Networking World®
Conference Manager
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